ATLAS

TO ACCOMPANY

THE SOILS AND AGRICULTURE OF

HONG KONG.

CHARLES J. GRANT.

MAY 1960.

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HONG KONG AND THE NEW TERRITORIES

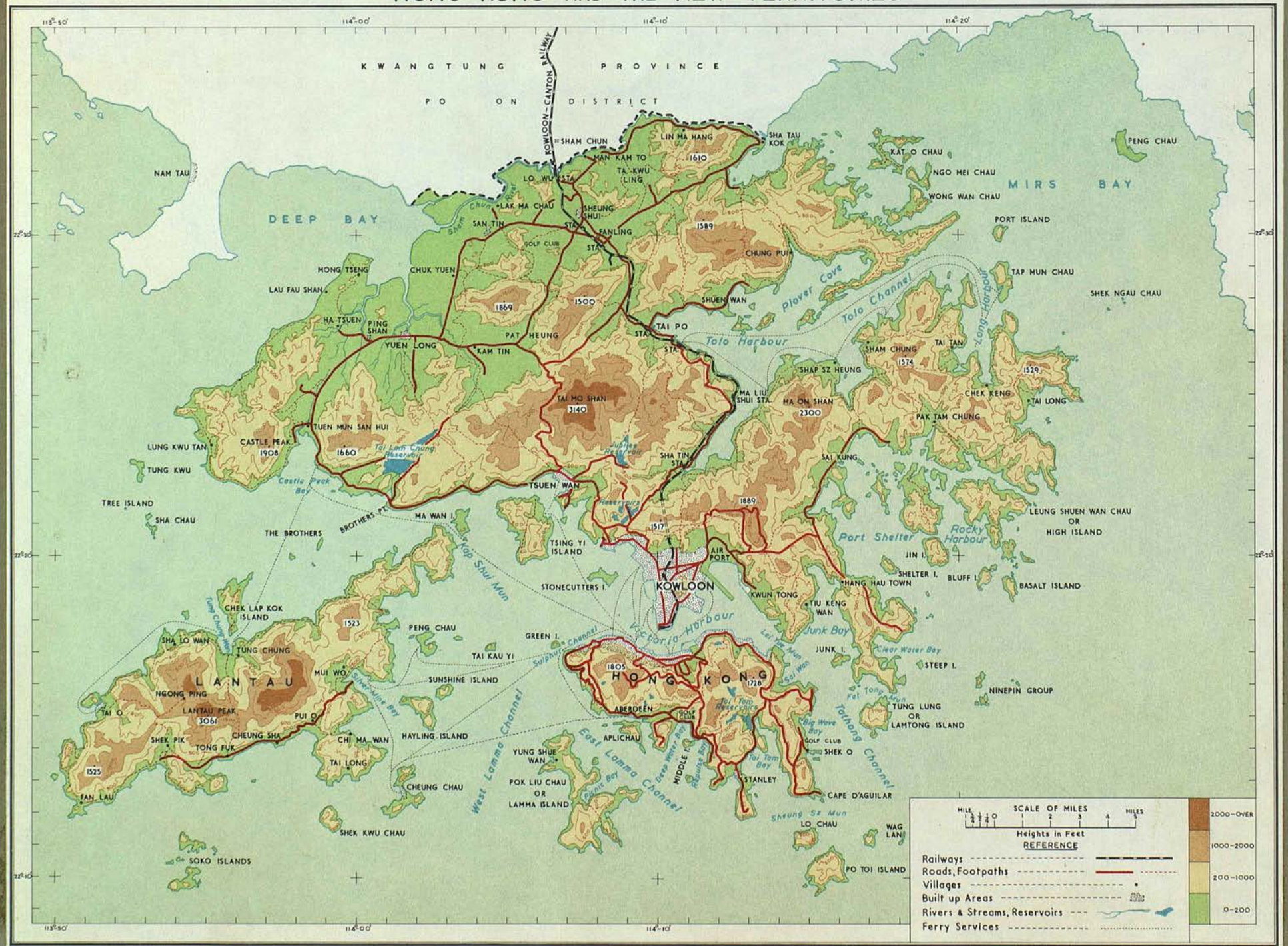


Fig. 1.

KEY MAP OF HONG KONG RELATIVE TO CANTON AND MACAU

Fig. 2.

Fig. 3.

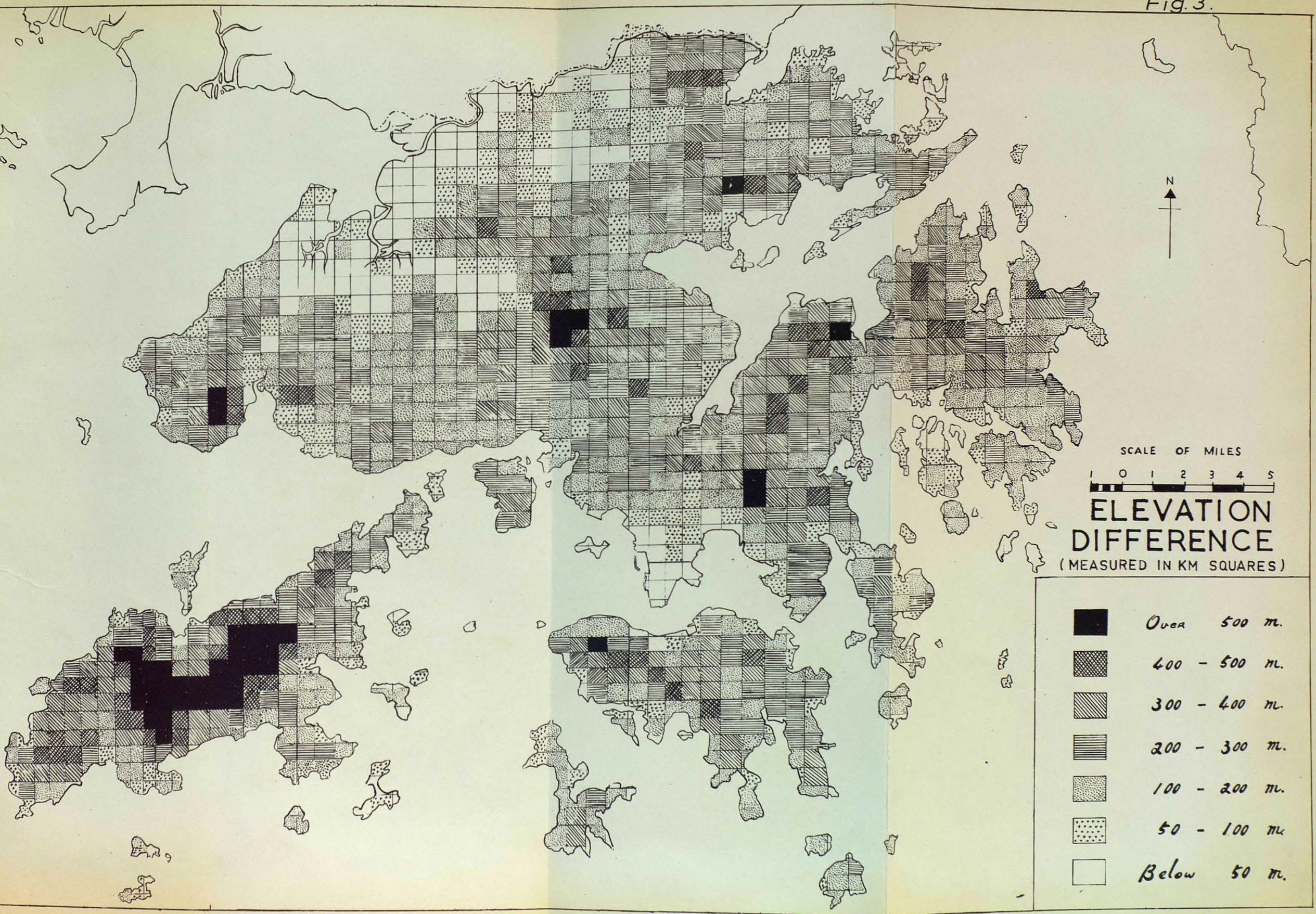
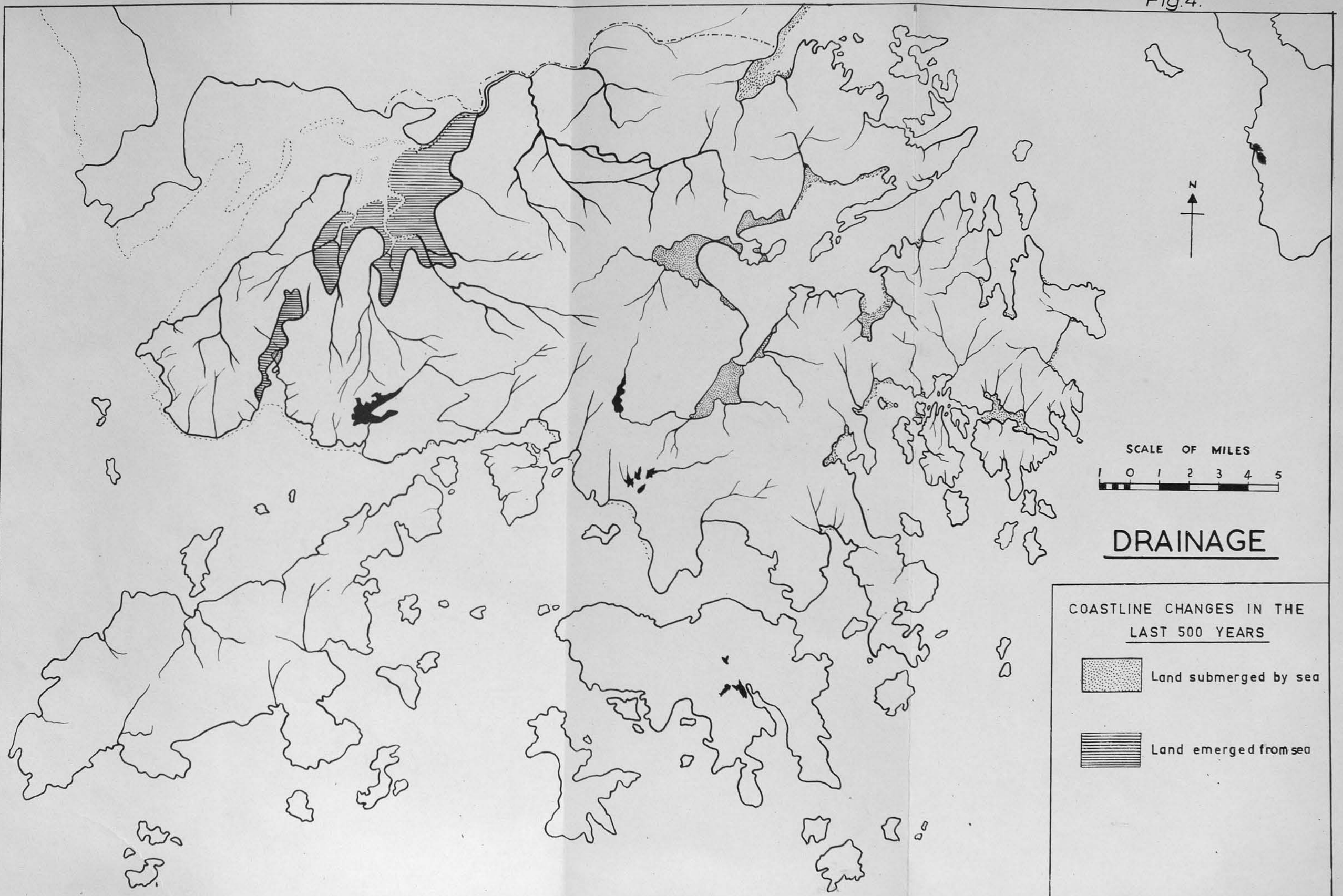

N
SCALE OF MILES
1 0 1 2 3 4 5
ELEVATION DIFFERENCE
(MEASURED IN KM SQUARES)
Over 500 m.
400 - 500 m.
300 - 400 m.
200 - 300 m.
100 - 200 m.
50 - 100 m.
Below 50 m.

Fig.4.


N
SCALE OF MILES
1 0 1 2 3 4 5
DRAINAGE
COASTLINE CHANGES IN THE LAST 500 YEARS
Land submerged by sea
Land emerged from sea

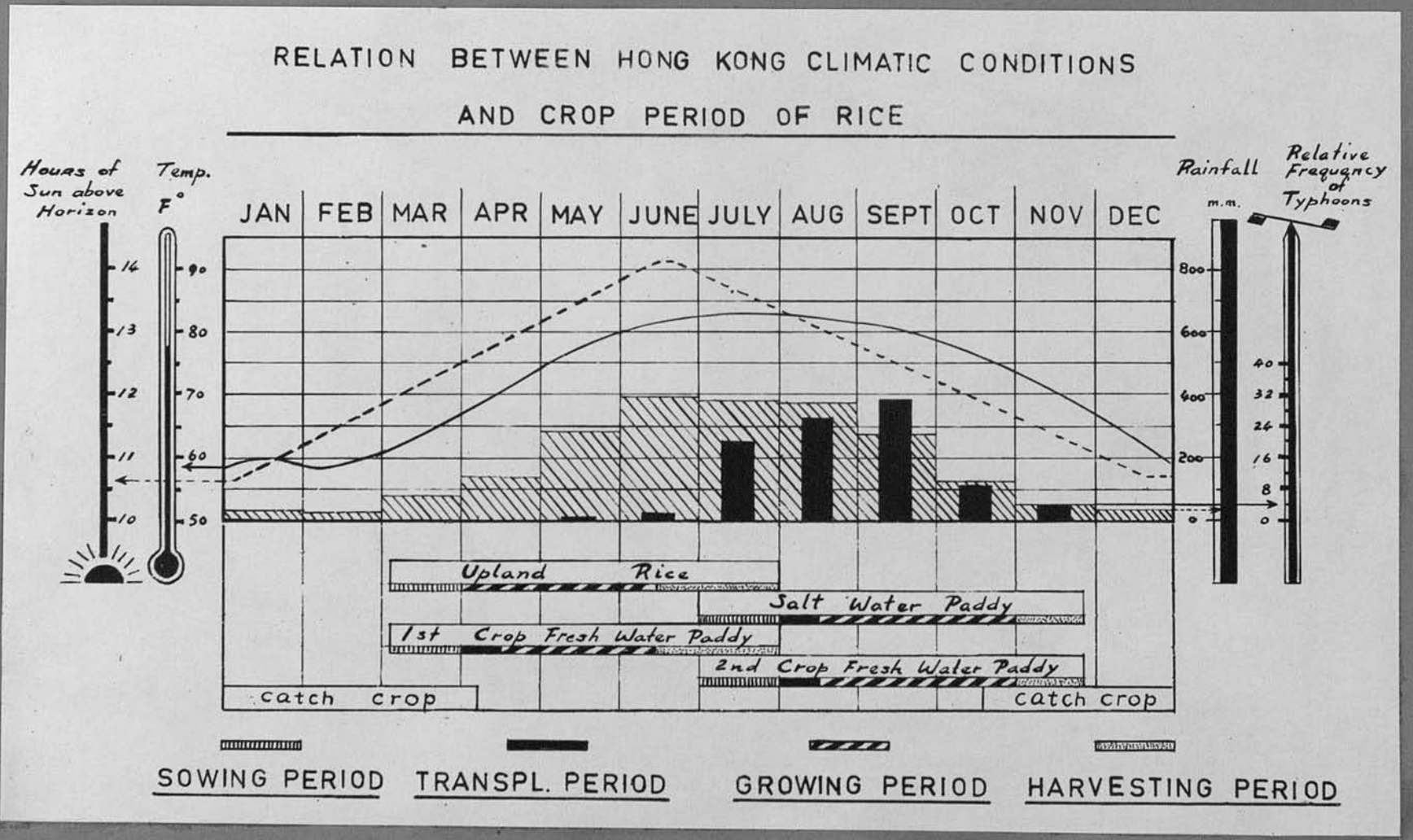

RELATION BETWEEN HONG KONG CLIMATIC CONDITIONS
AND CROP PERIOD OF RICE
Hours of Sun above Horizon
Temp. F°
Rainfall m.m.
Relative Frequency of Typhoons
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
14 13 12 11 10
90 80 70 60 50
800 600 400 200 0
40 32 24 16 8 0
Upland Rice
Salt Water Paddy
1st Crop Fresh Water Paddy
2nd Crop Fresh Water Paddy
catch crop
catch crop
SOWING PERIOD
TRANSPL. PERIOD
GROWING PERIOD
HARVESTING PERIOD

Fig. 5.

Fig. 6.

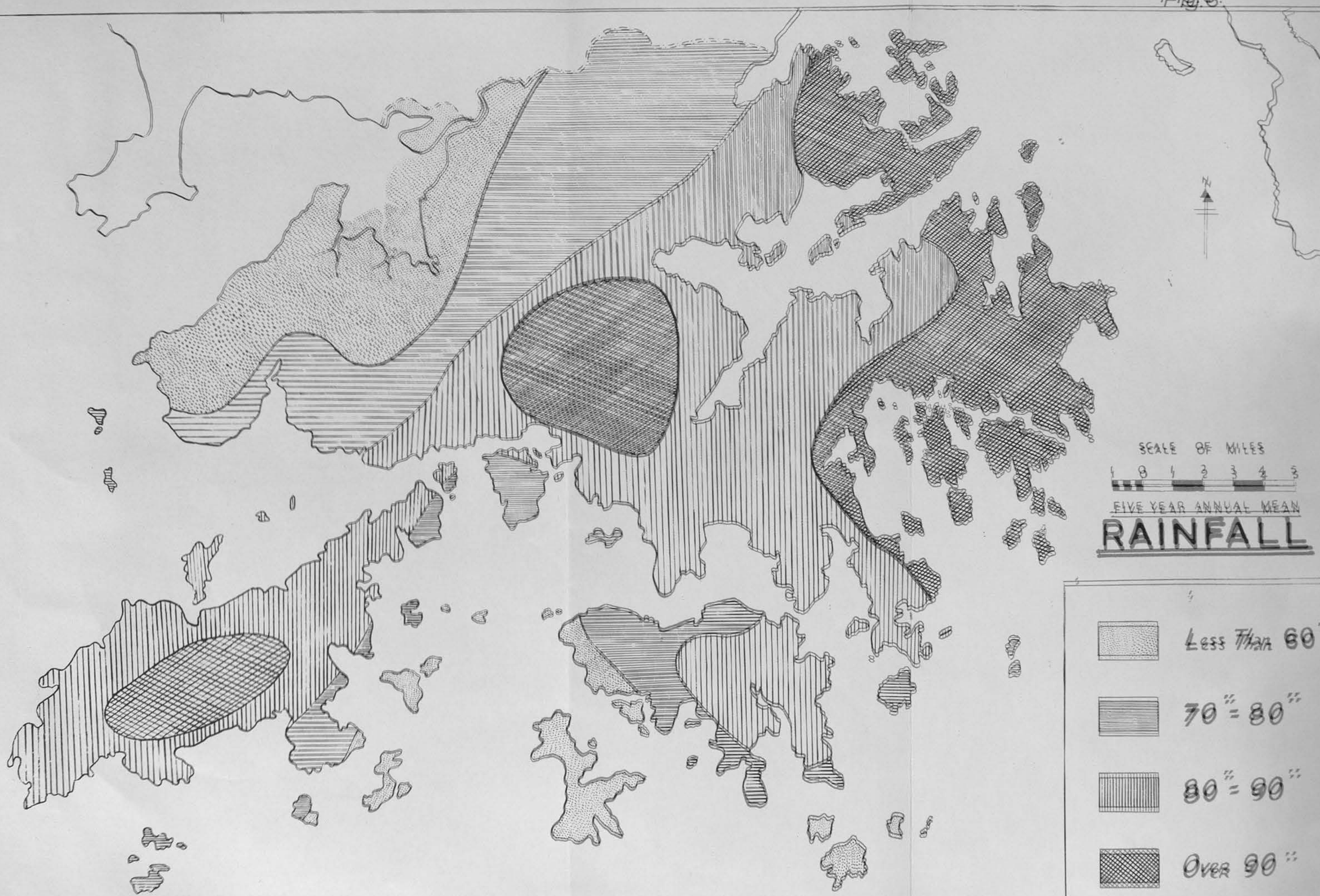
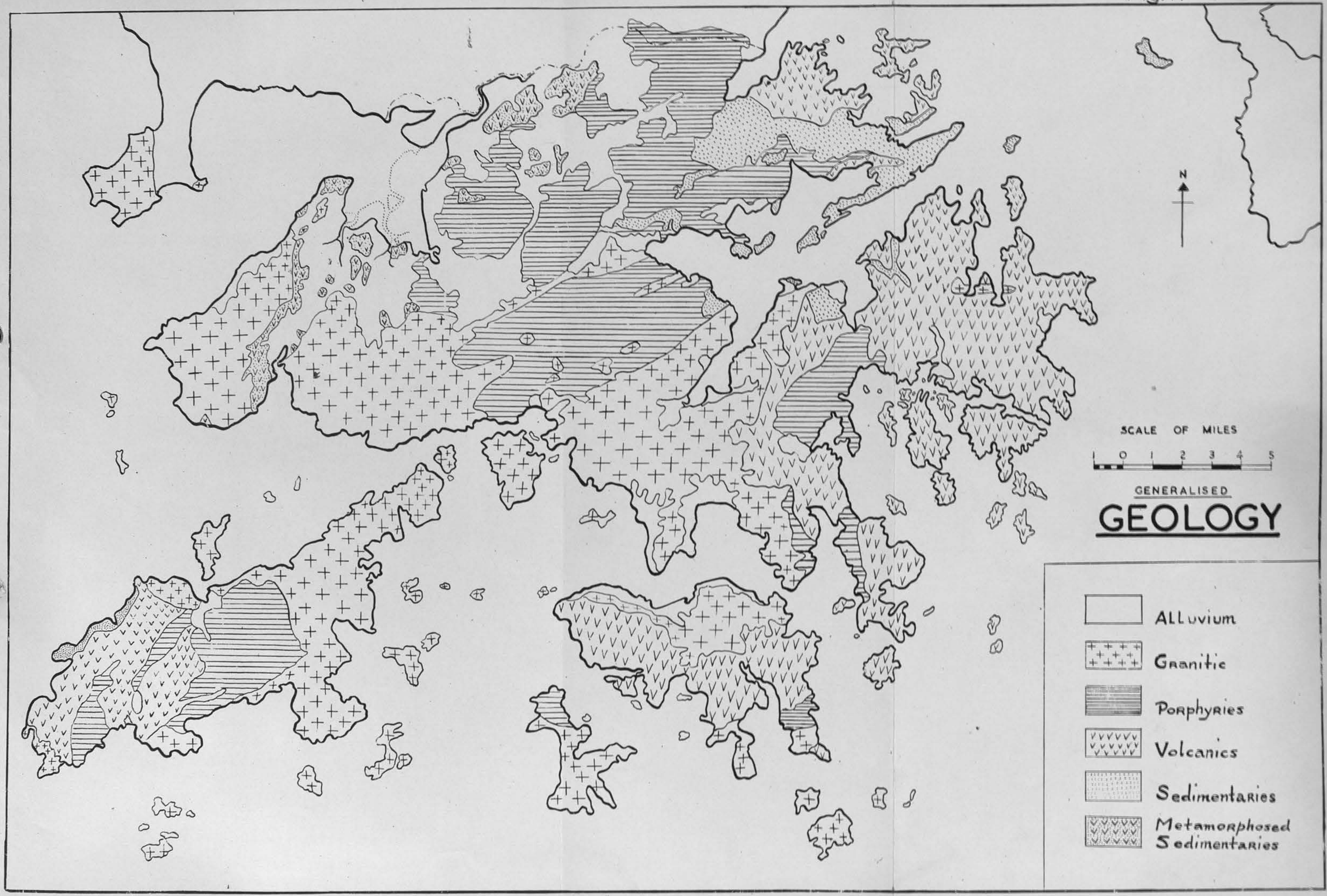
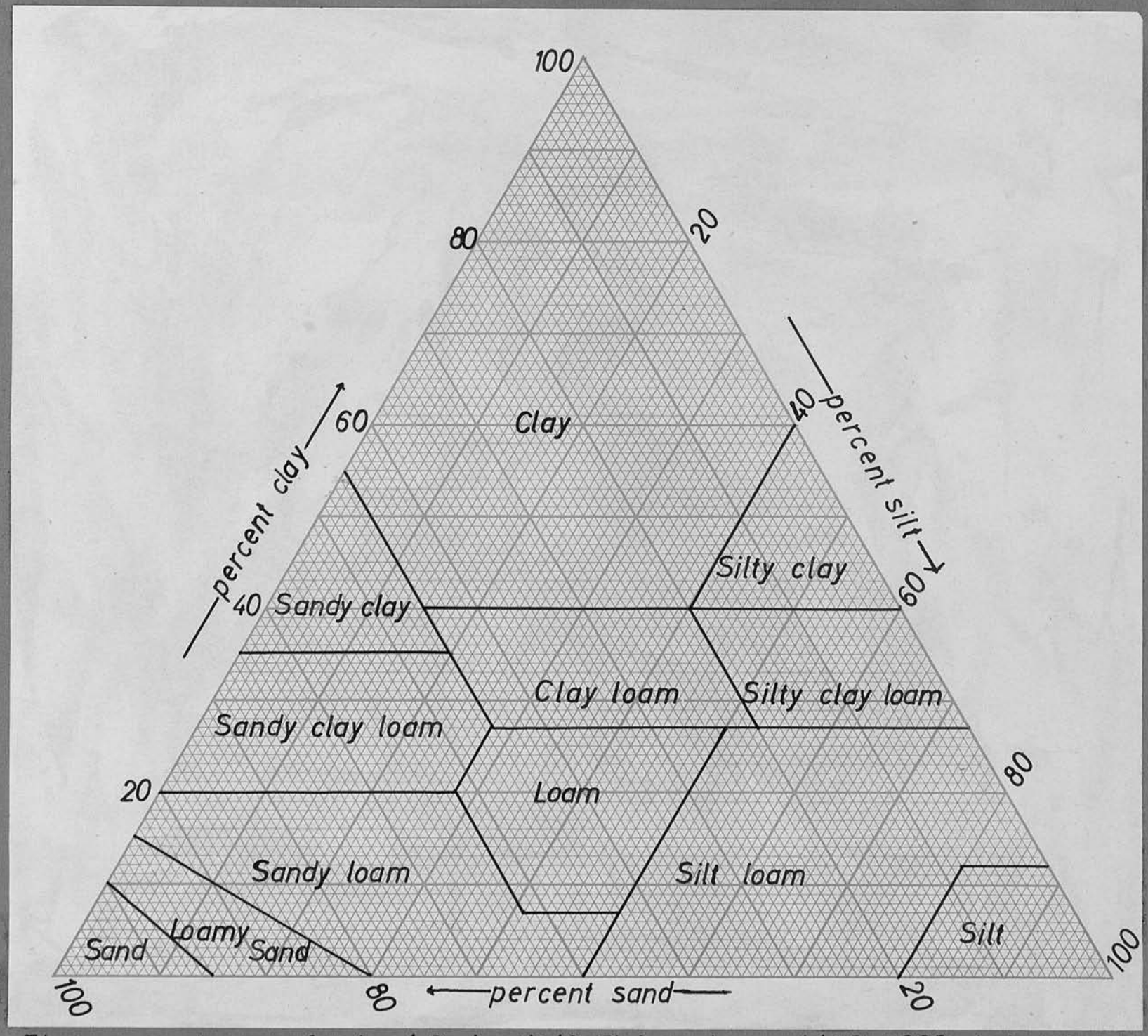

N
SCALE OF MILES
0 1 2 3 4 5
FIVE YEAR ANNUAL MEAN
RAINFALL
Less Than 60"
70" = 80"
80" = 90"
Over 90"

Fig. 7.


N
SCALE OF MILES
0 1 2 3 4 5
GENERALISED
GEOLOGY
Alluvium
Granitic
Porphyries
Volcanics
Sedimentaries
Metamorphosed Sedimentaries



The percentages of clay (>2 μ), silt (2-50μ), and sand (50-2000 μ), in the main soil textural classes.

Fig. 8.

GENERALISED BLOCK DIAGRAM SHOW TYPICAL FORMATION OF PARENT MATERIALS OF HONG KONG SOILS

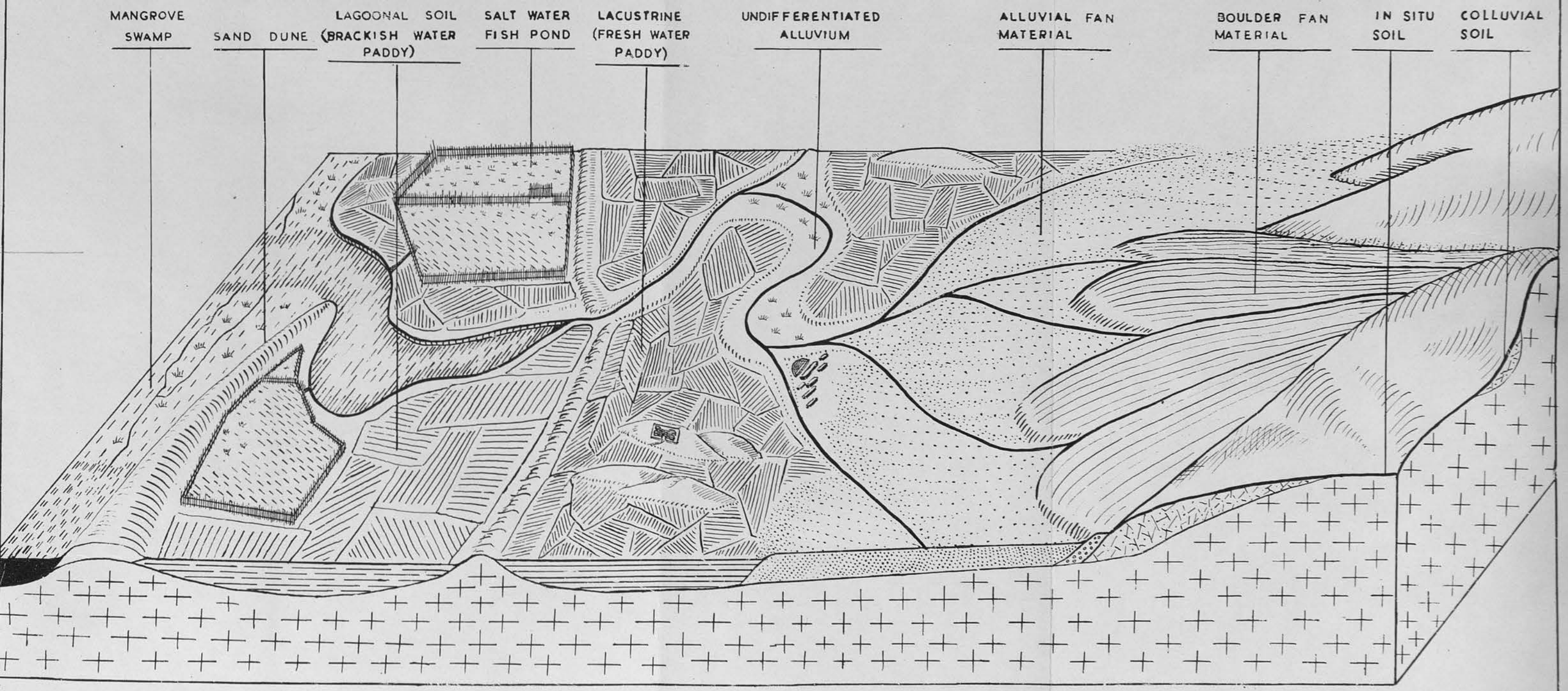
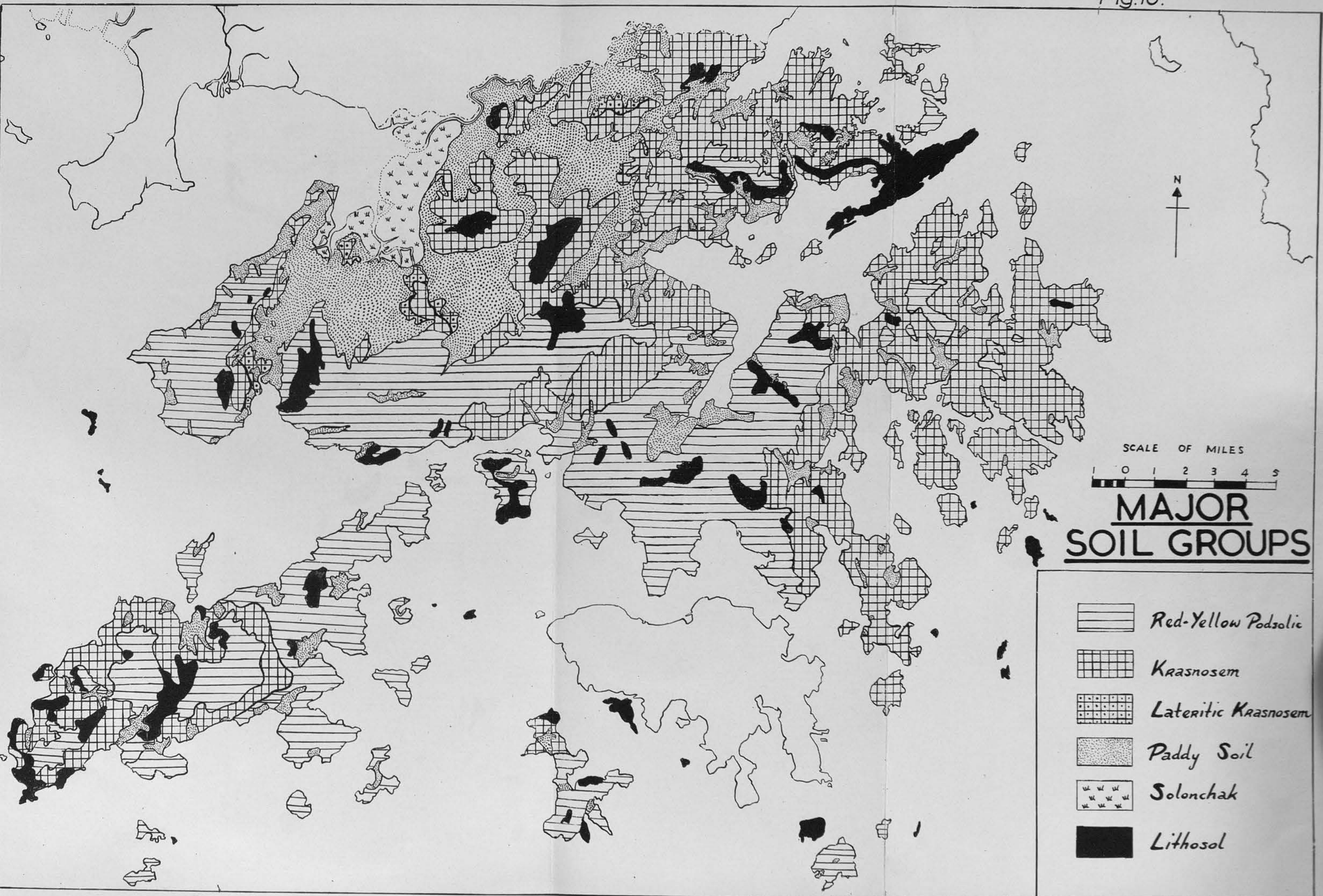
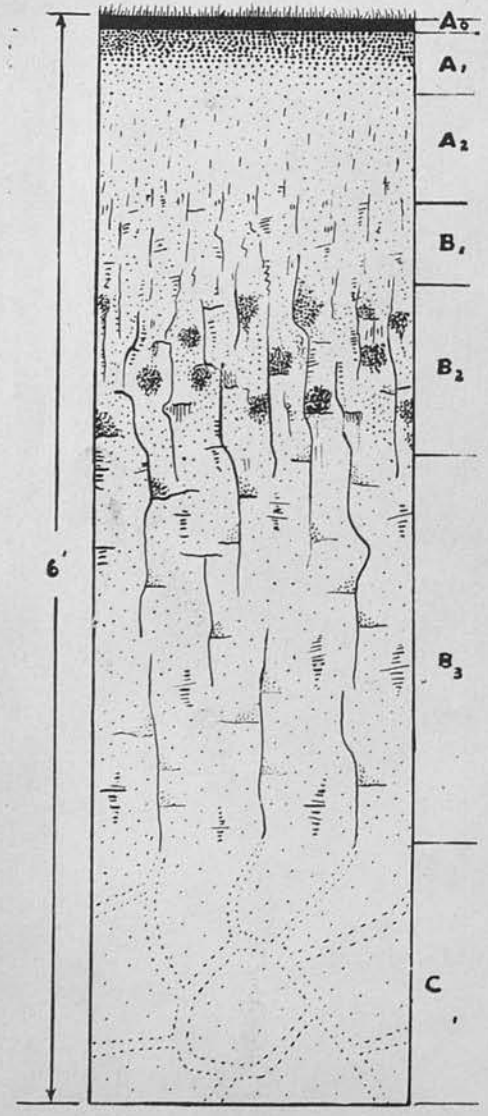


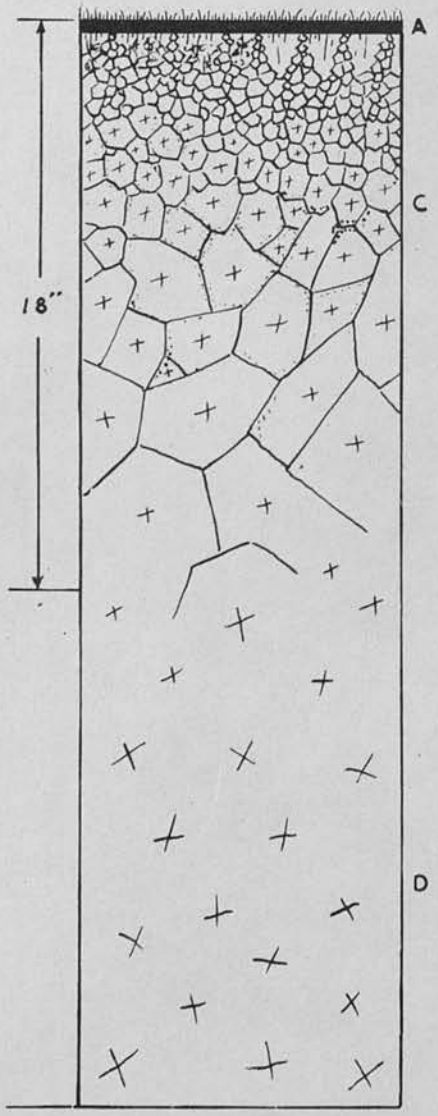
Fig.10.


N
SCALE OF MILES
1 0 1 2 3 4 5
MAJOR SOIL GROUPS
Red-Yellow Podsolic
Krasnosem
Lateritic Krasnosem
Paddy Soil
Solonchak
Lithosol

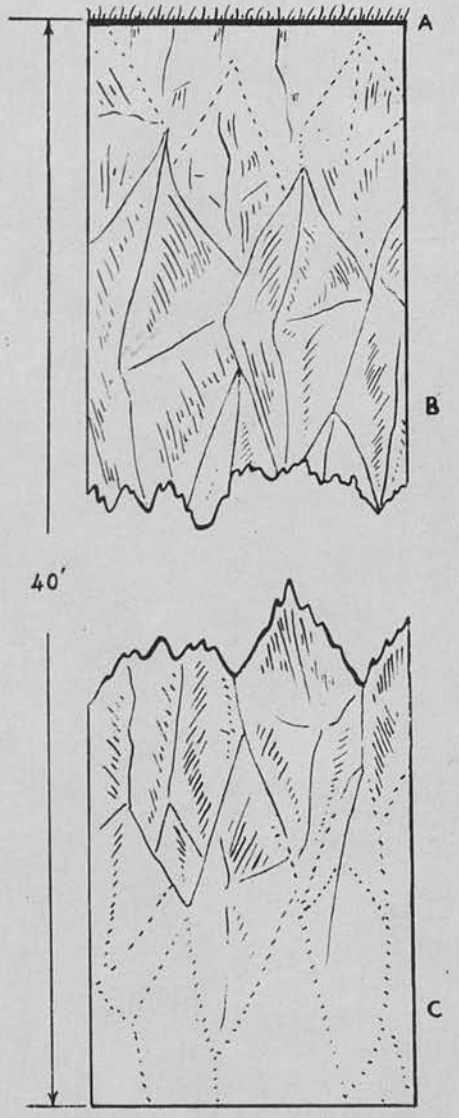
HORIZON NOMENCLATURE FOR MAJOR SOIL GROUPS OF HONG KONG



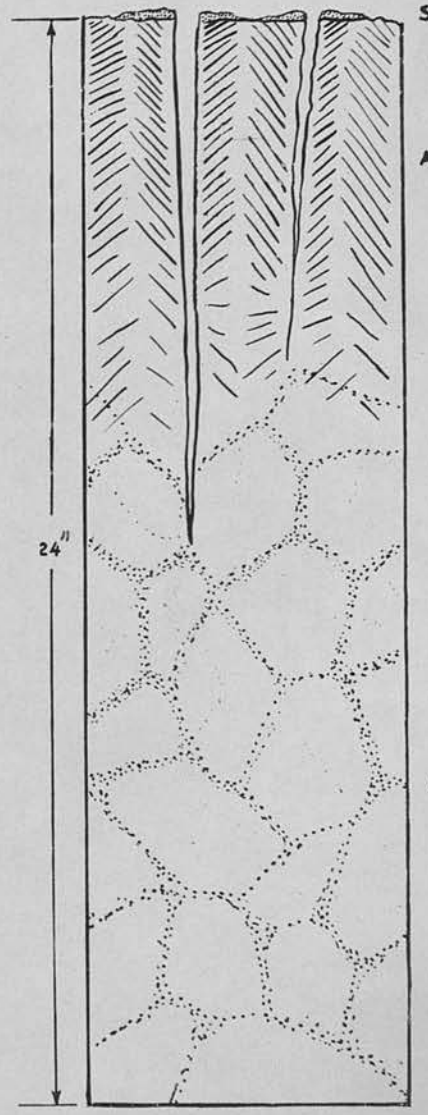
A. RED-YELLOW PODSOLIC



B. LITHOSOL.



C. KRASNOSEM.



D. SALINE SOIL.

Fig. 11.

COLOUR	STRUCTURE	MOTTLES
Grey Brown 2.5Y 5/2	Platy Amorphous	Iron Threads along roots
Light Yellowish Brown 10YR 6/4	Indurated Platy tendency	Ochreous mottling
Yellowsih 10YR 6/8	Coarse prismatic or Angular blocky with clay coated faces	Small iron mottles & larger flecks of Manganese
Dk. Blue Grey 5Y 1/4	Amorphous	

APO ..... Subscript 'P' indicates, 'O' indicates oxidation.

APg ..... Subscript 'g' indicates gleying.

Ahg ..... Ploughpan, the more or less compacted subsurface horizon.

B2IR1 ..... IRONPAN.

B2MN1 ..... MANGANESE PAN.

B2MN2

Bg

B2MN3 ..... Manganese accumulation layer

B2IR2 ..... Iron accumulation layer

G ..... Gleyed horizon underlying the Bg or the Ag if no Bg is present.

HORIZON NOMENCLATURE FOR PADDY SOILS.

Fig. 12.

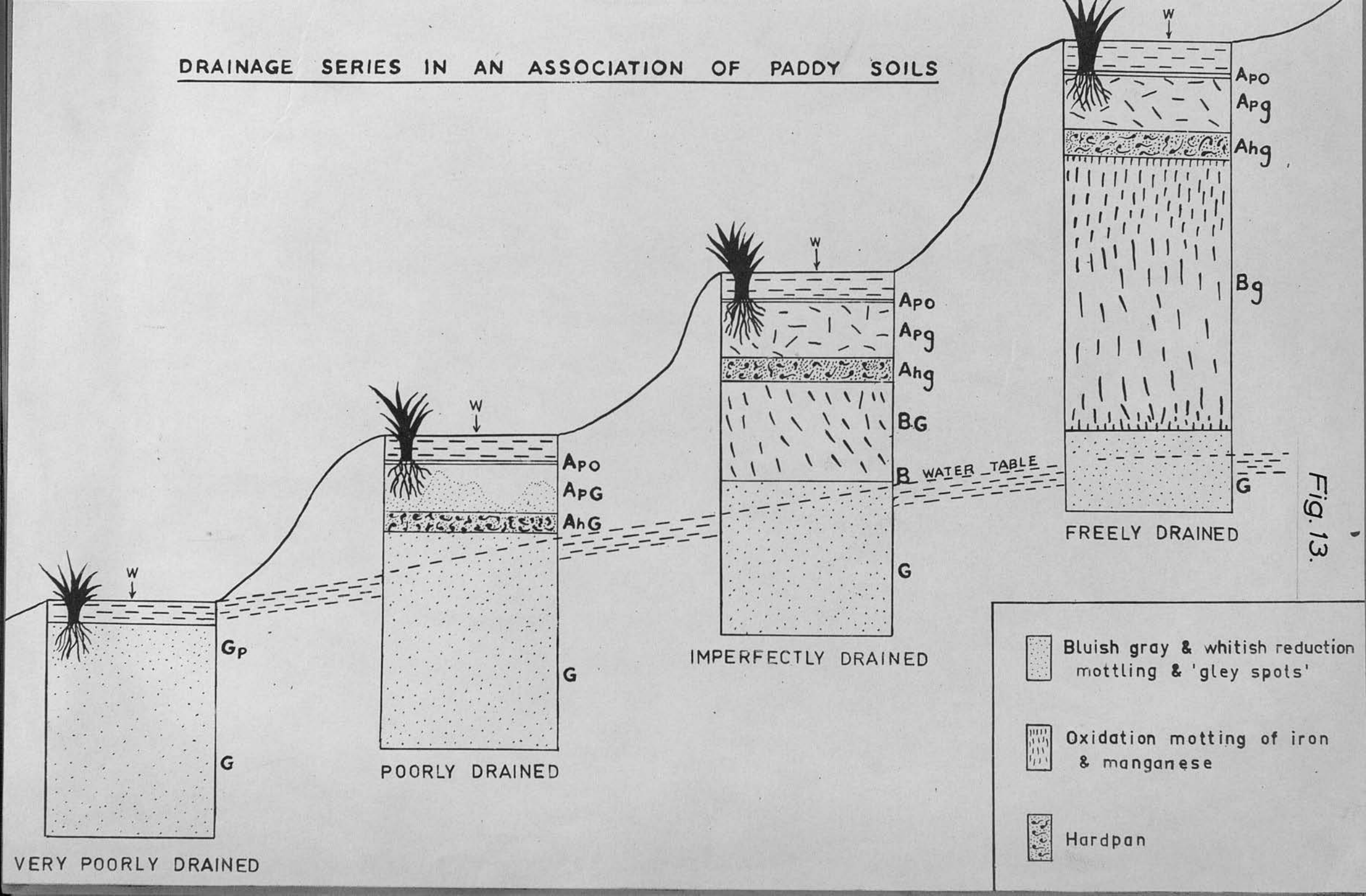

DRAINAGE SERIES IN AN ASSOCIATION OF PADDY SOILS
W
Apo
Apg
Ahg
Bg
G
FREELY DRAINED
W
Apo
Apg
Ahg
B.G
B
WATER TABLE
G
IMPERFECTLY DRAINED
W
Apo
ApG
AhG
G
POORLY DRAINED
W
Gp
G
VERY POORLY DRAINED
Bluish gray & whitish reduction mottling & 'gley spots'
Oxidation motting of iron & manganese
Hardpan

Fig. 13.

DIFFERENTIATION OF PROFILE IN TOPSOIL OF FLOODED PADDY SOIL

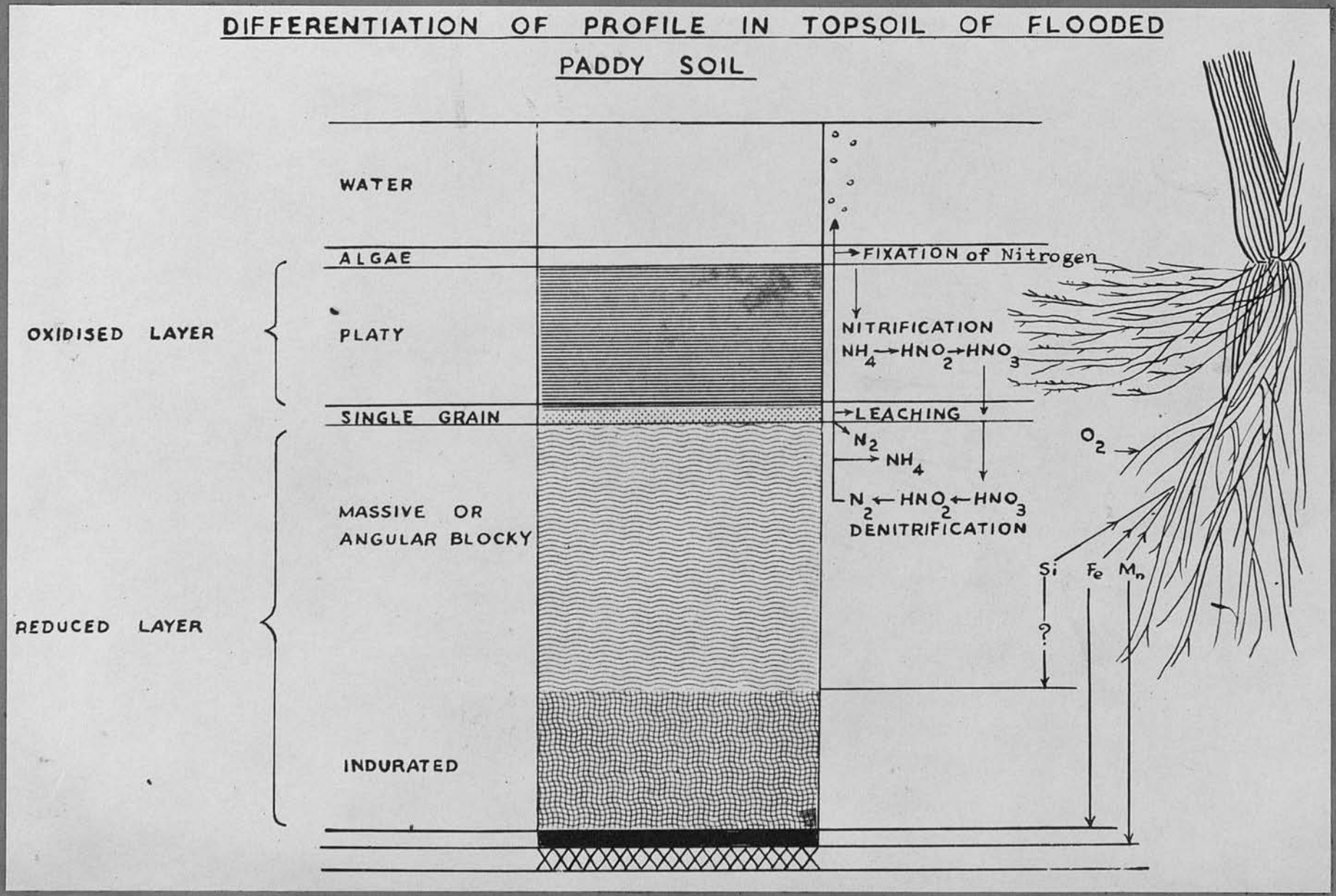


Fig. 14.

Fig. 15.

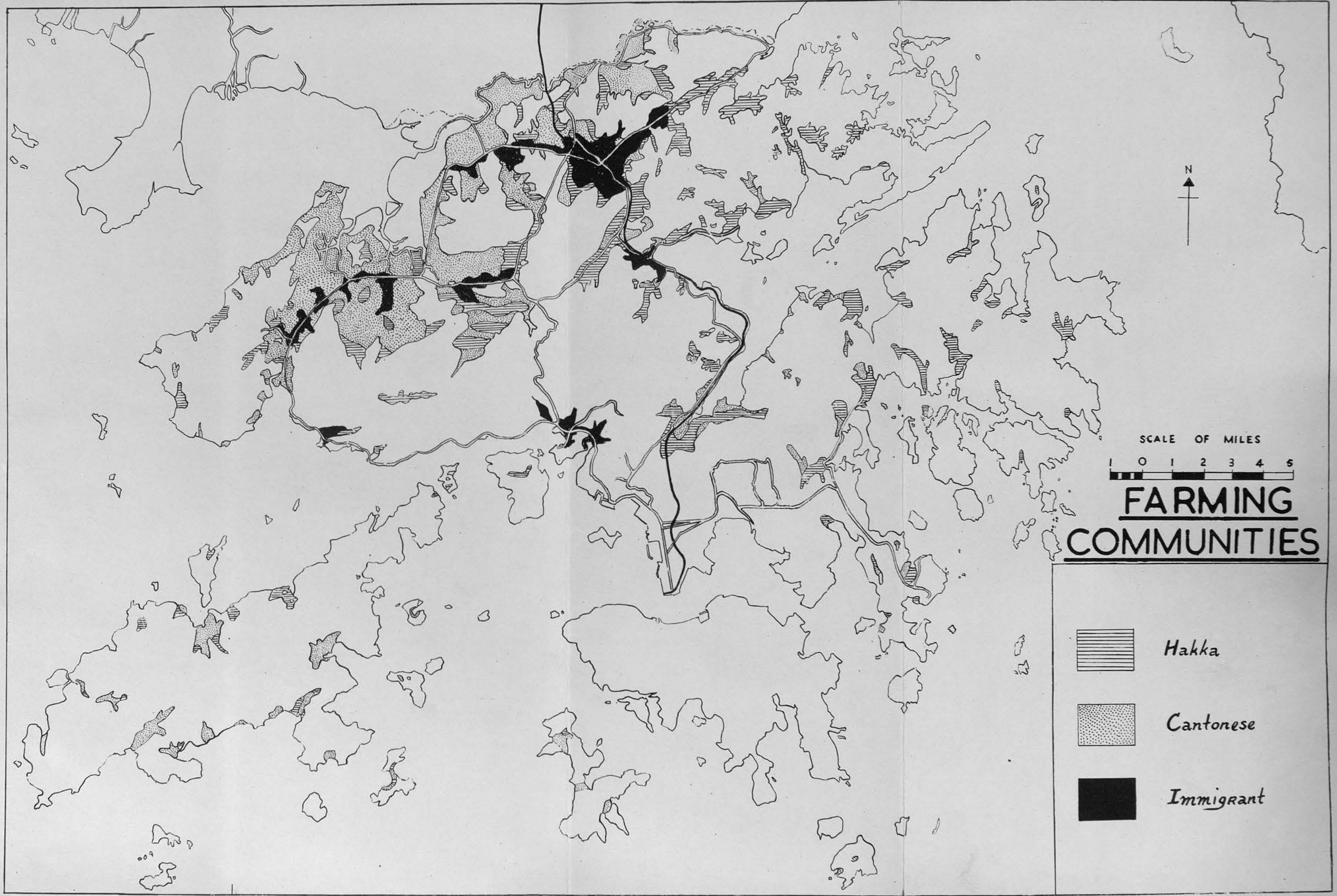
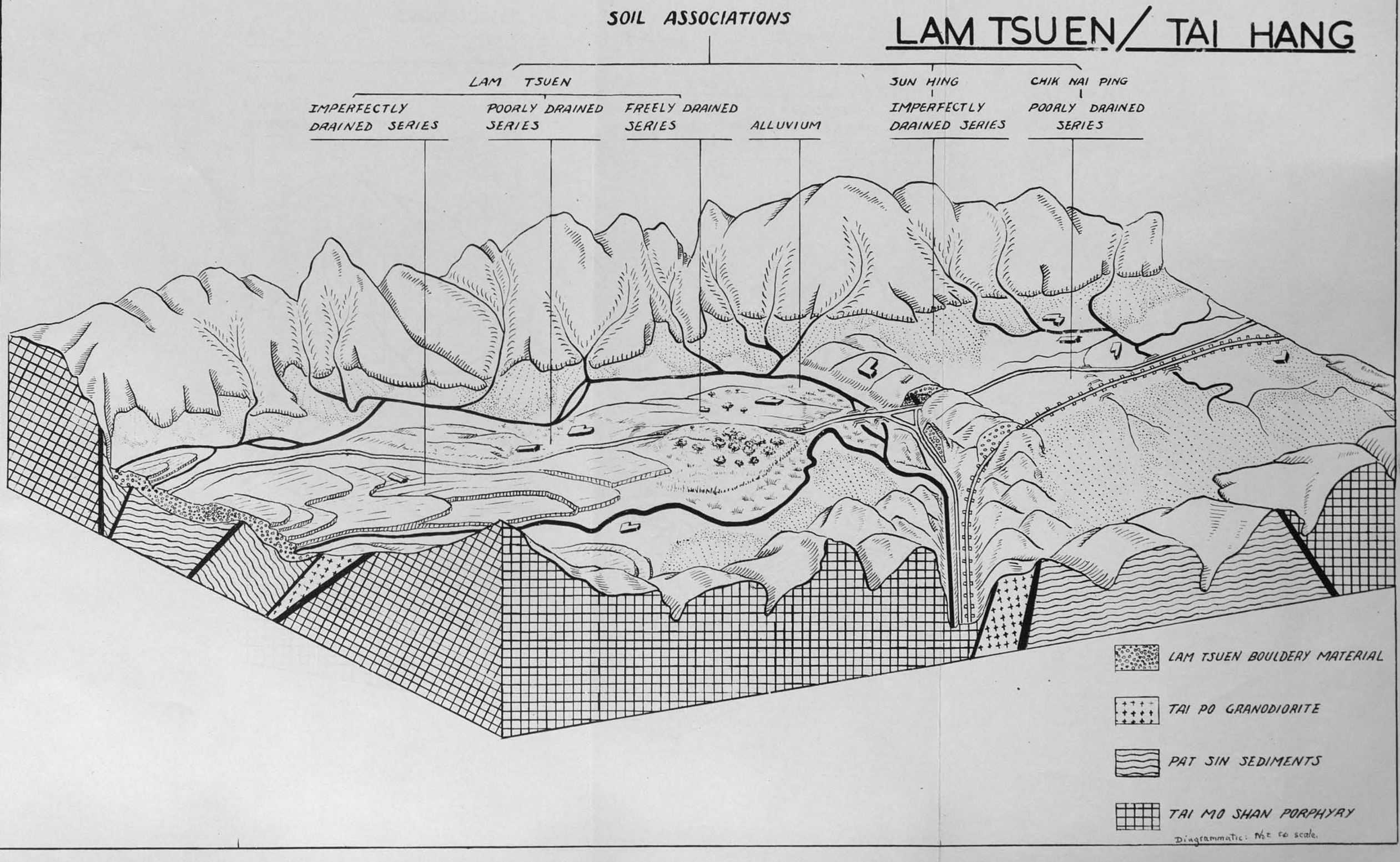

N
SCALE OF MILES
1 0 1 2 3 4 5
FARMING COMMUNITIES
Hakka
Cantonese
Immigrant

Fig. 16.

DIAGRAMMATIC REPRESENTATION OF THE GEOMORPHOLOGY OF LAM TSUEN/ TAI HANG



Diagrammatic: Not to scale.

Fig. 17.

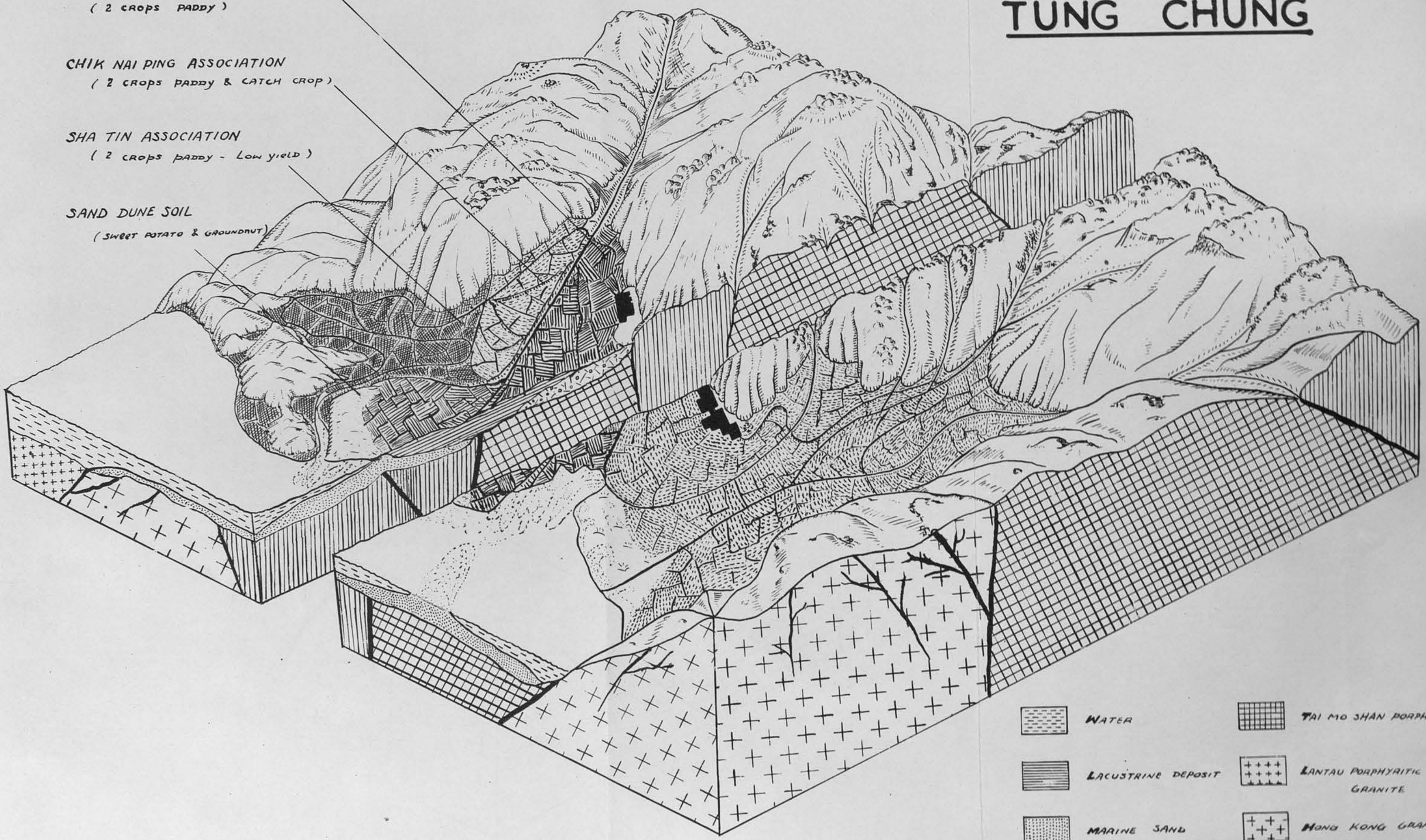
TUNG CHUNG

SEK KONG ASSOCIATION
(2 CROPS PADDY)

CHIK NAI PING ASSOCIATION
(2 CROPS PADDY & CATCH CROP)

SHA TIN ASSOCIATION
(2 CROPS PADDY - LOW YIELD)

SAND DUNE SOIL
(SWEET POTATO & GROUNDNUT)



WATER

LACUSTRINE DEPOSIT

MARINE SAND

BOULDER FAN MATERIAL

TAI MO SHAN PORPHYRY

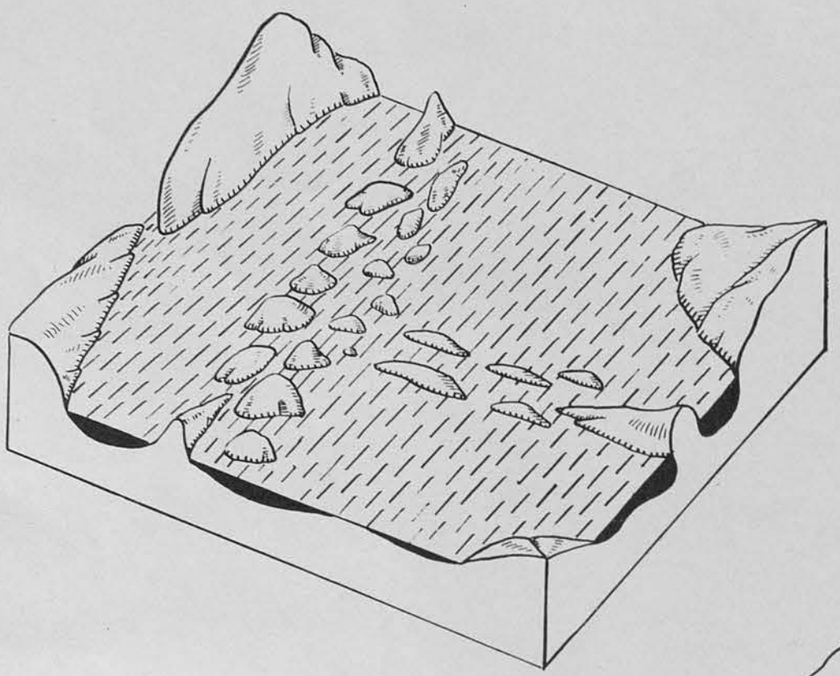
LANTAU PORPHYRITIC GRANITE

HONG KONG GRANITE

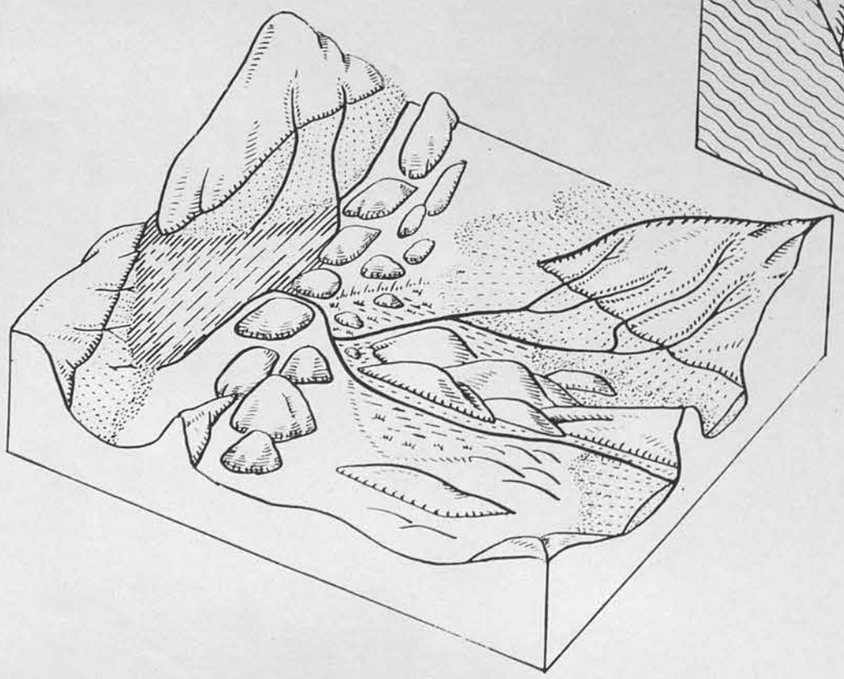
REPULSE BAY VOLCANICS

Diagrammatic : Not to scale.

STAGE I.



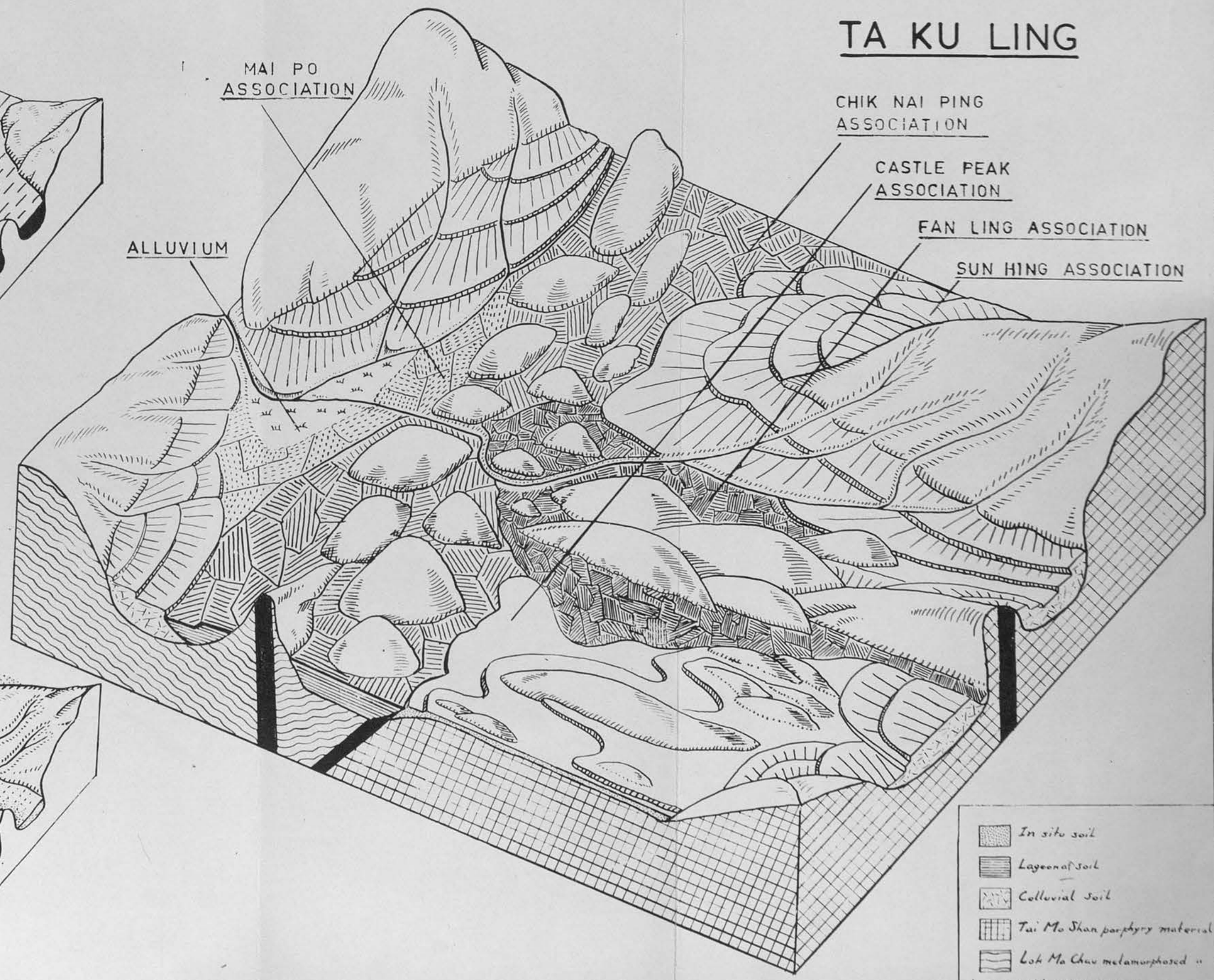
STAGE II.



STAGE III.

SIMPLIFIED REPRESENTATION OF STAGES IN DEVELOPMENT OF

TA KU LING



Diagrammatic: Not to Scale

Note on the Land Use and Productivity Maps - figs. 19(a) - 26(b).

The following land use and productivity maps are designed to amplify and complement the data on the paddy soils contained in the folding maps in the pocket at the end of this volume.

Where possible the maps are self explanatory. The figures for productivity of the rice fields, though quoted in catties per dau chung should be considered as general indices rather than absolute, or precise statistics. The maps of productivity were compiled during the first rice harvest of 1959. Figures of rice yield are based on farmers statements and a field survey carried out by a specially trained team of investigators from the Department of Agriculture in Hong Kong.

KAM TIN

LAND USE

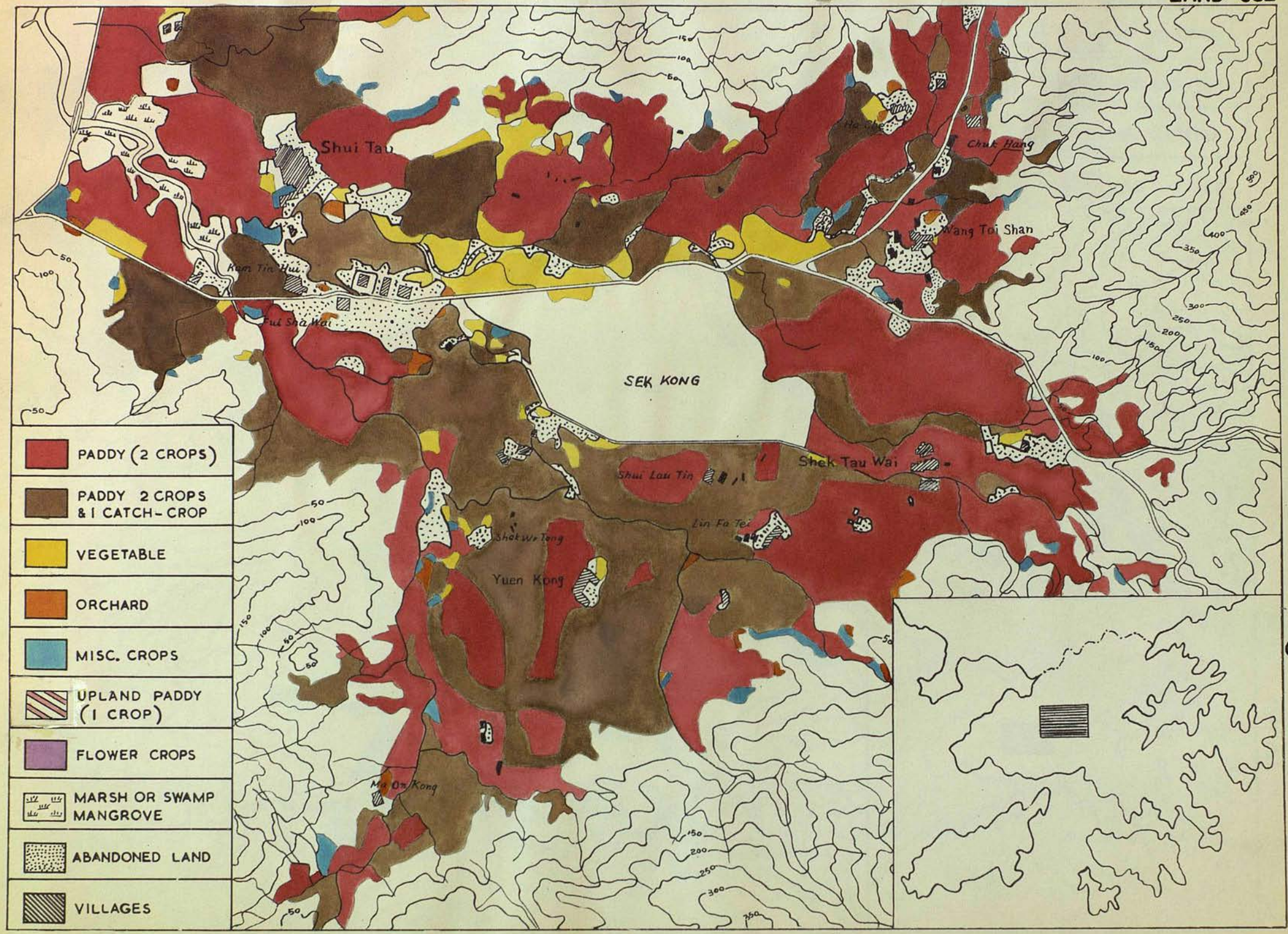


Fig. 19(a).

KAM TIN

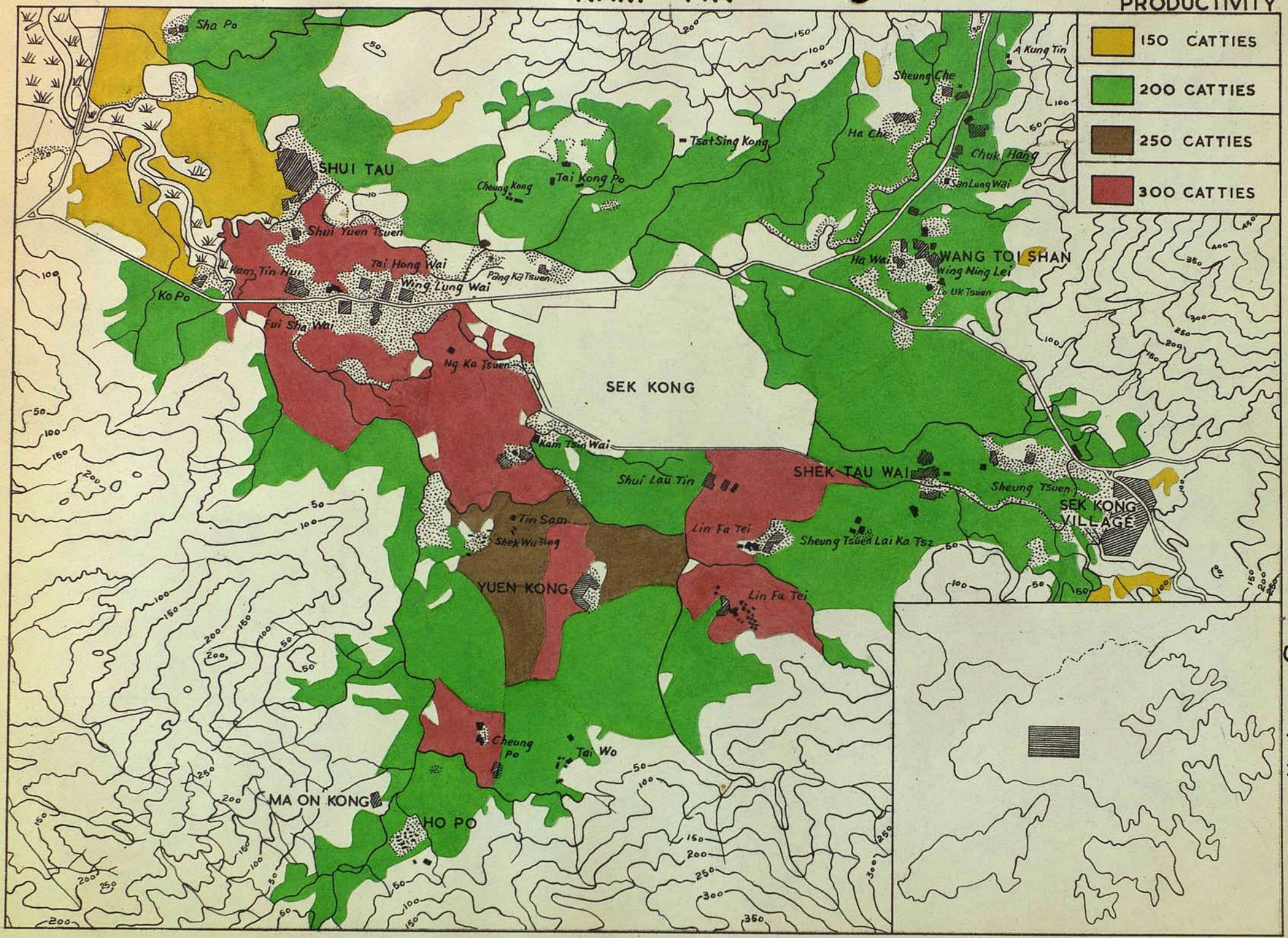


Fig. 19(b).

Fig. 20(a)

LAM TSUEN — TAI SHUI HANG

LAND USE

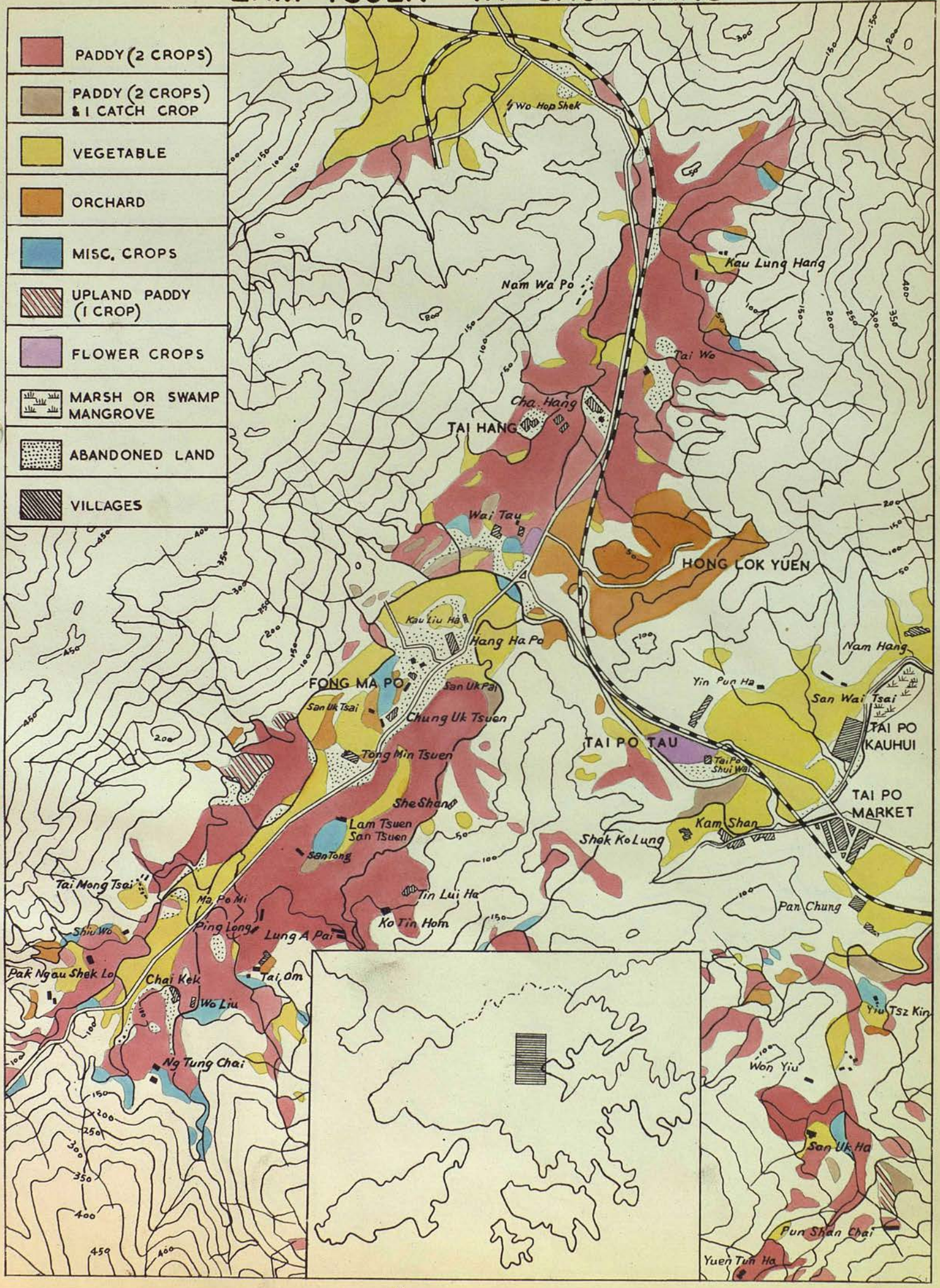


Fig. 20(b)

LAM TSUEN—TAI SHUI HANG PRODUCTIVITY

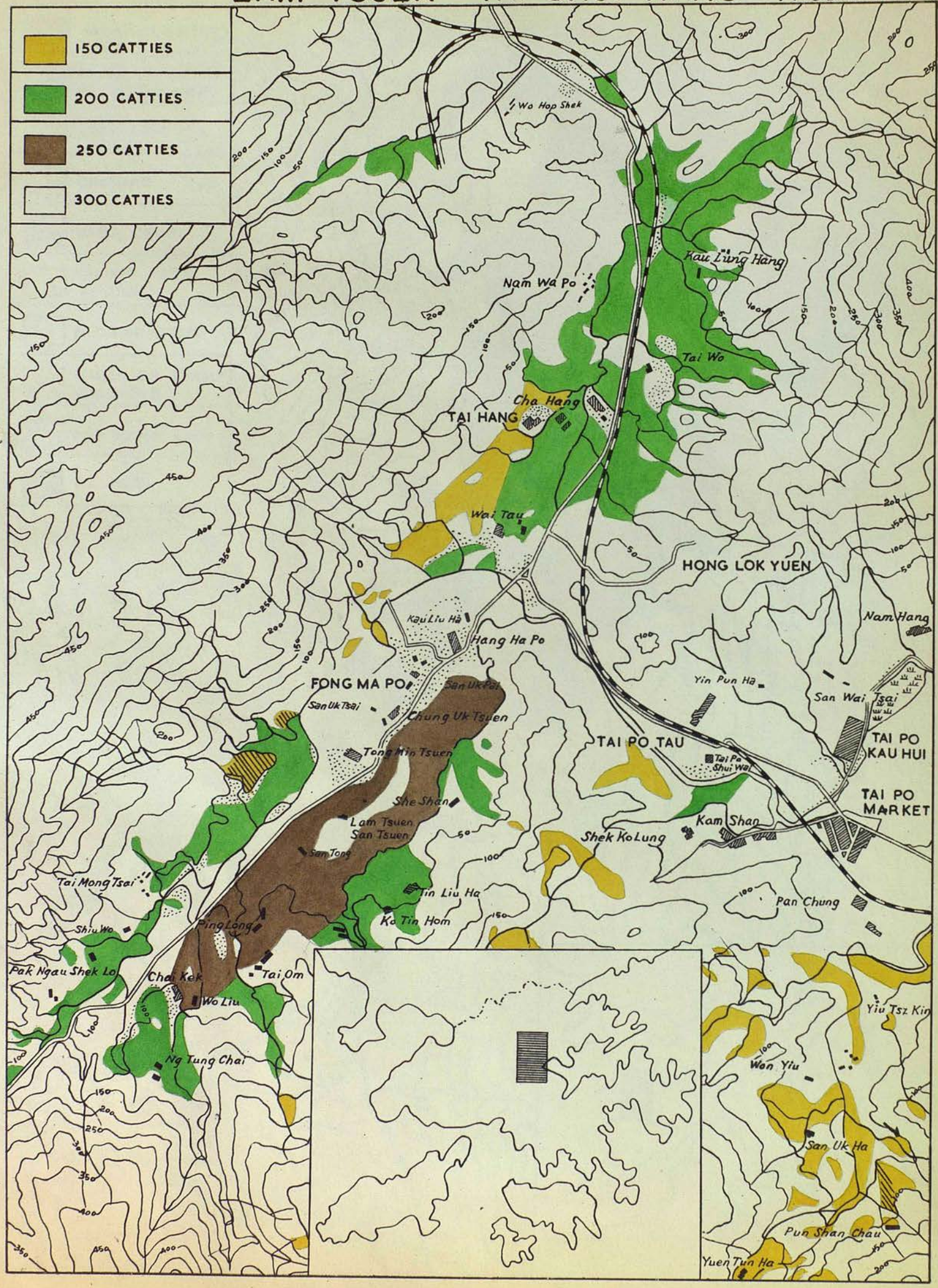


Fig. 21(a).

CASTLE PEAK— PING SHAN

LAND USE

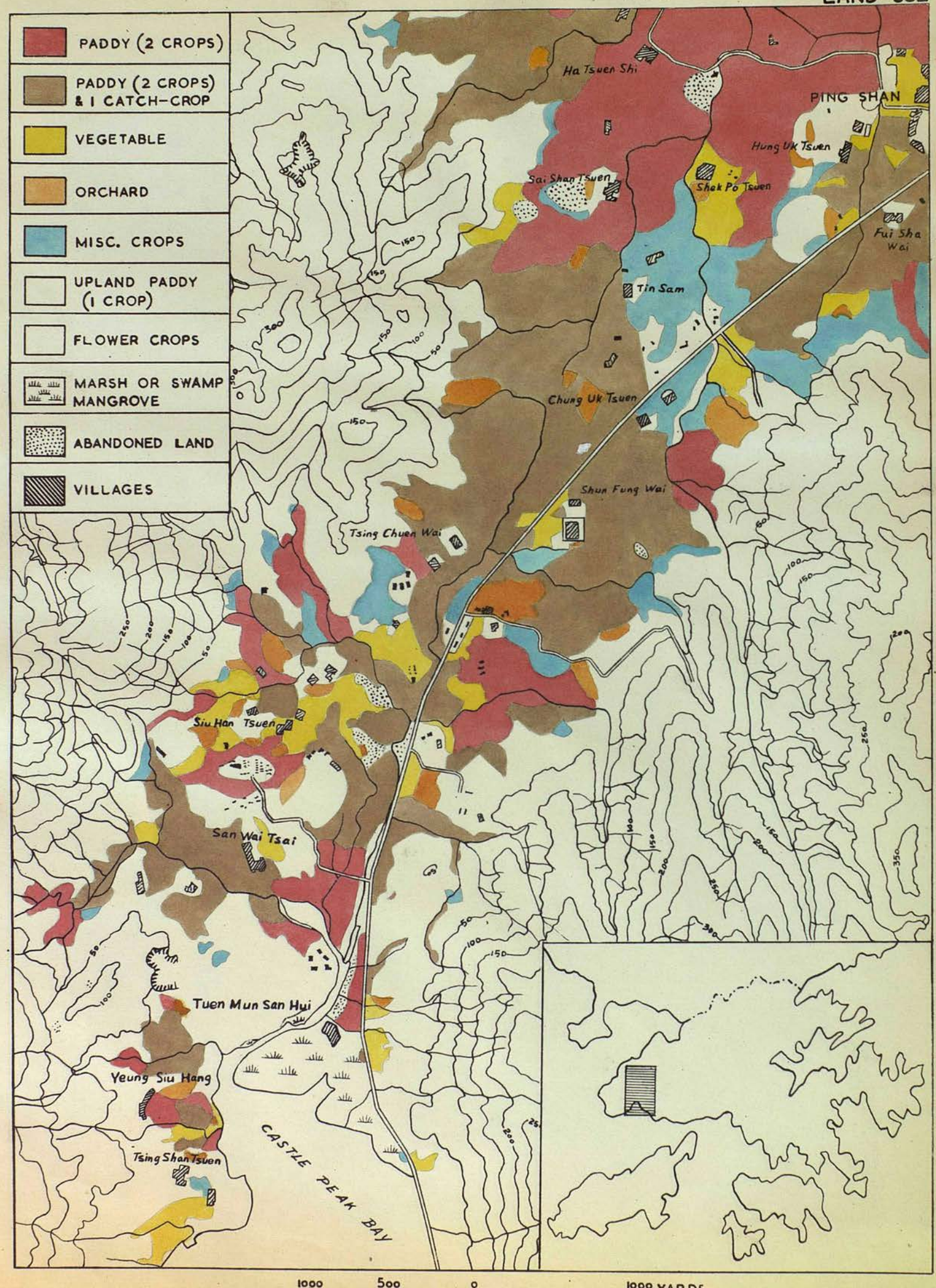
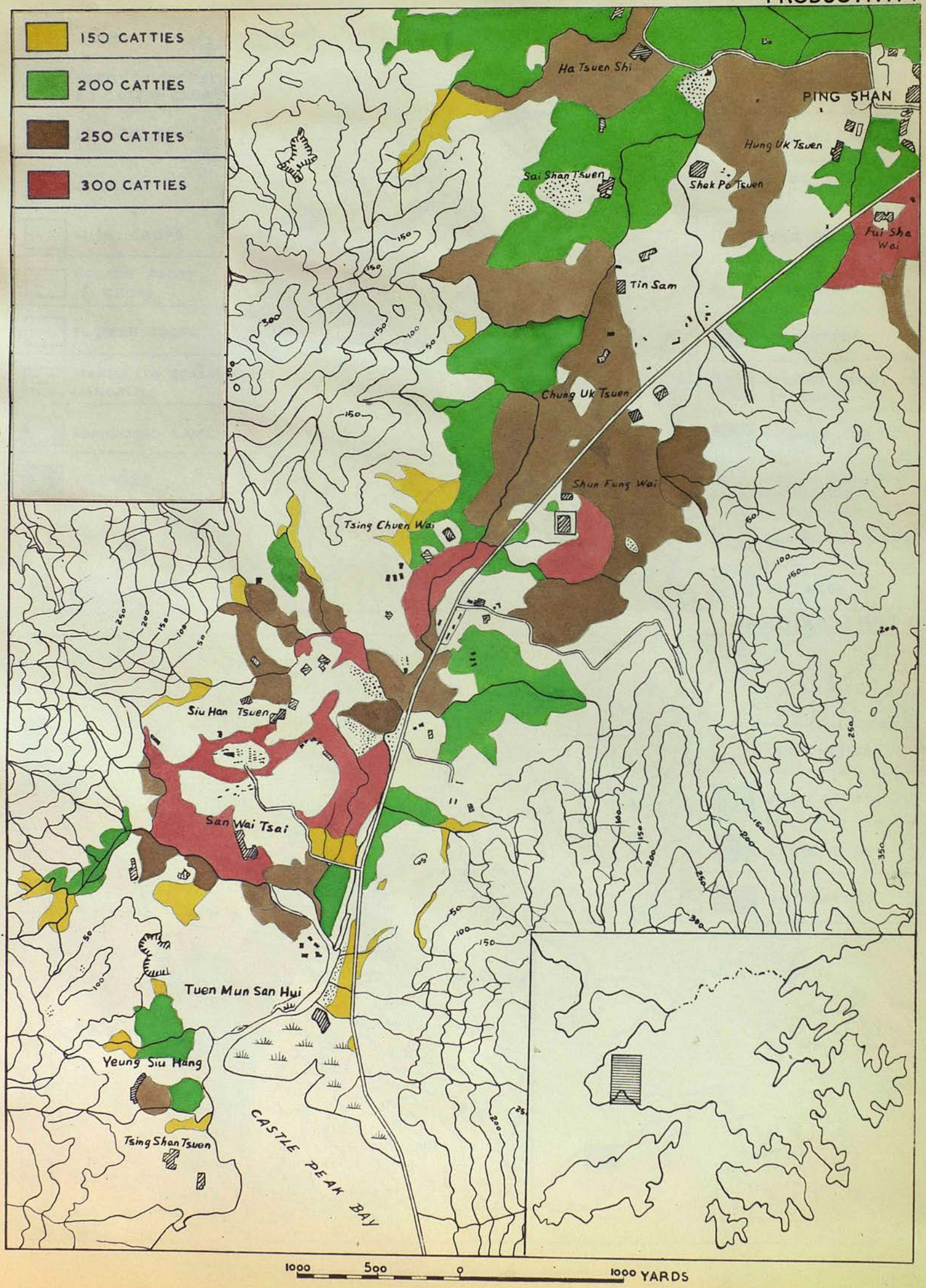


Fig. 21(b).

CASTLE PEAK— PING SHAN

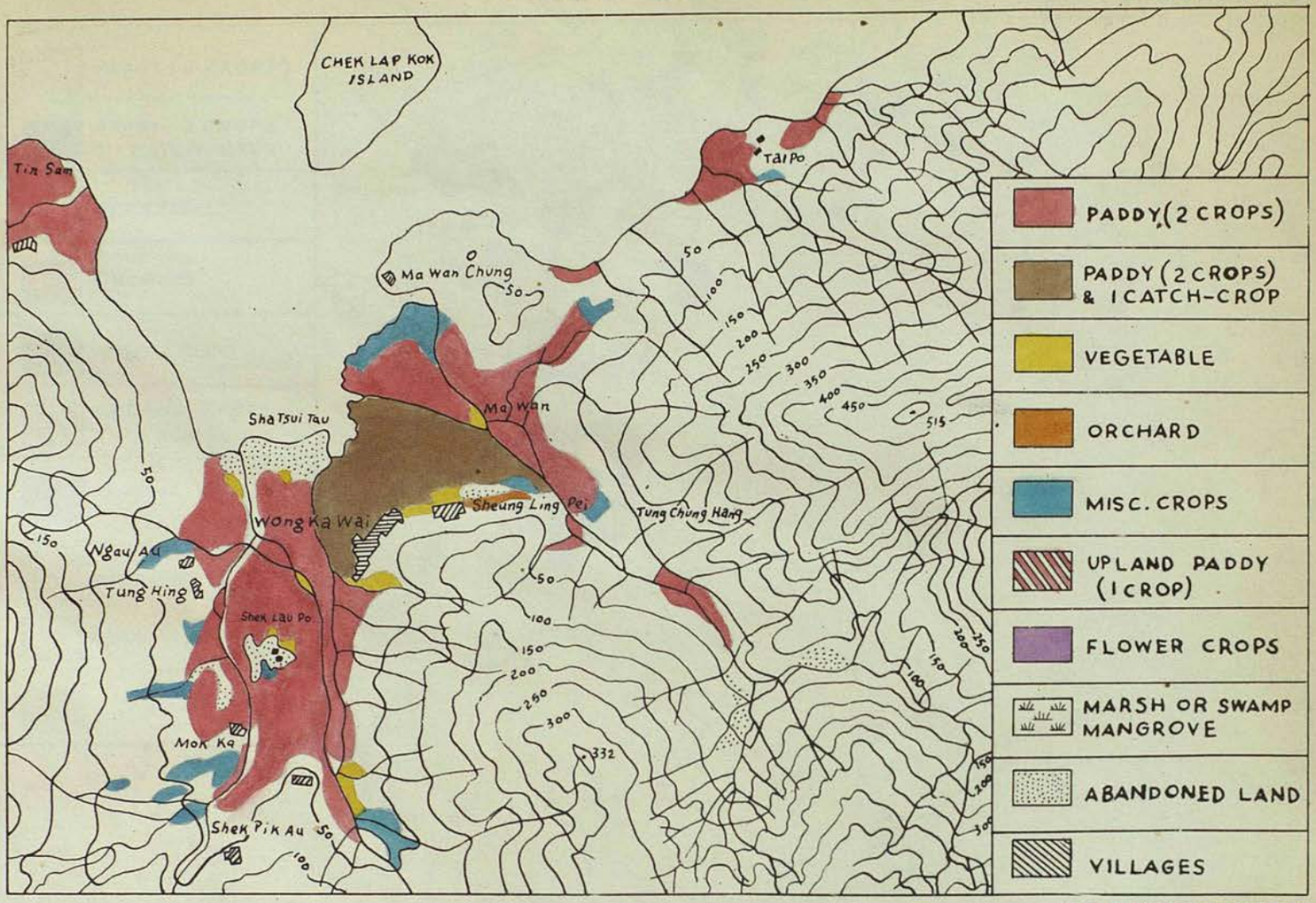
PRODUCTIVITY



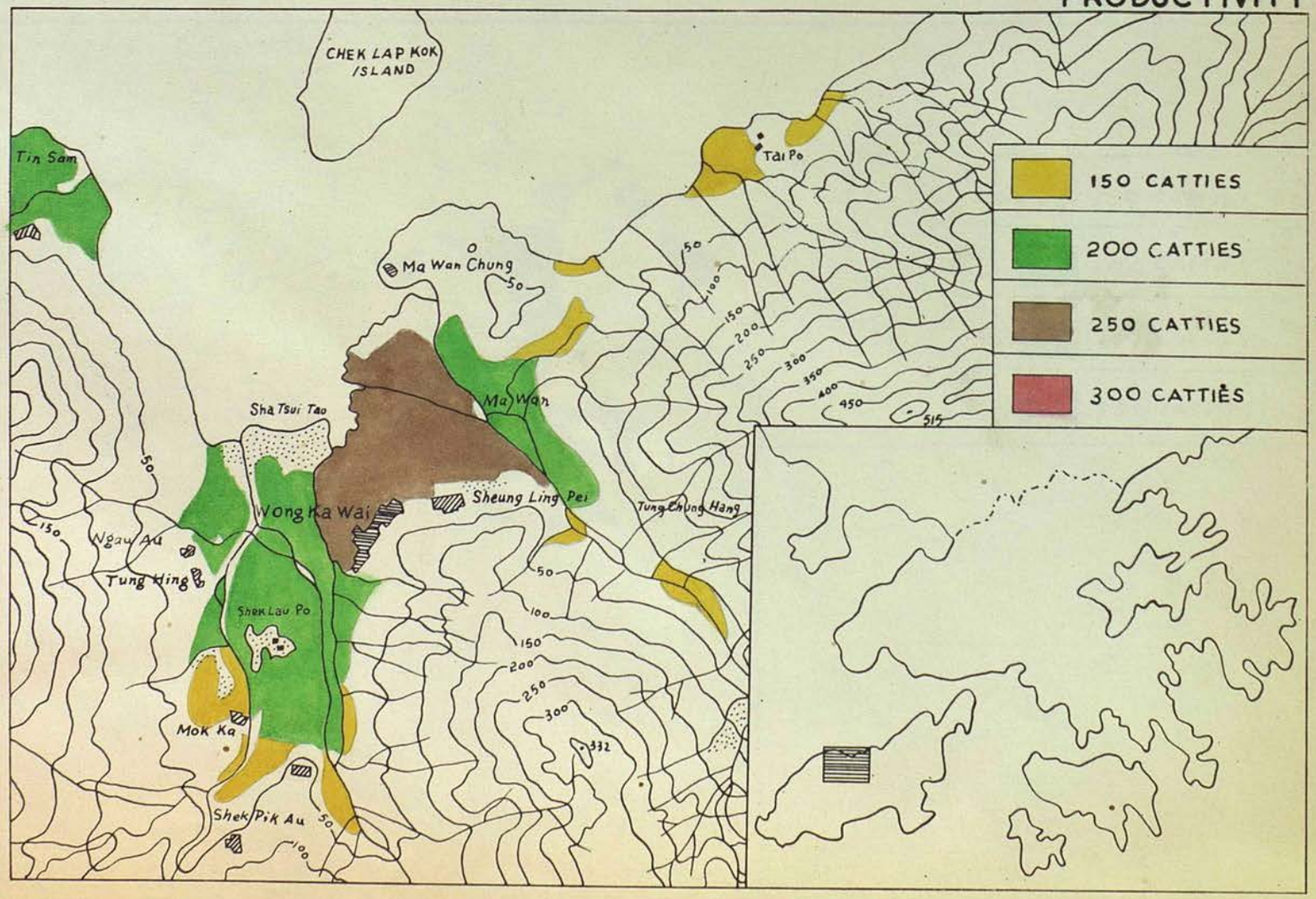
TUNG CHUNG

Fig. 22(a).

LAND USE



PRODUCTIVITY (b)

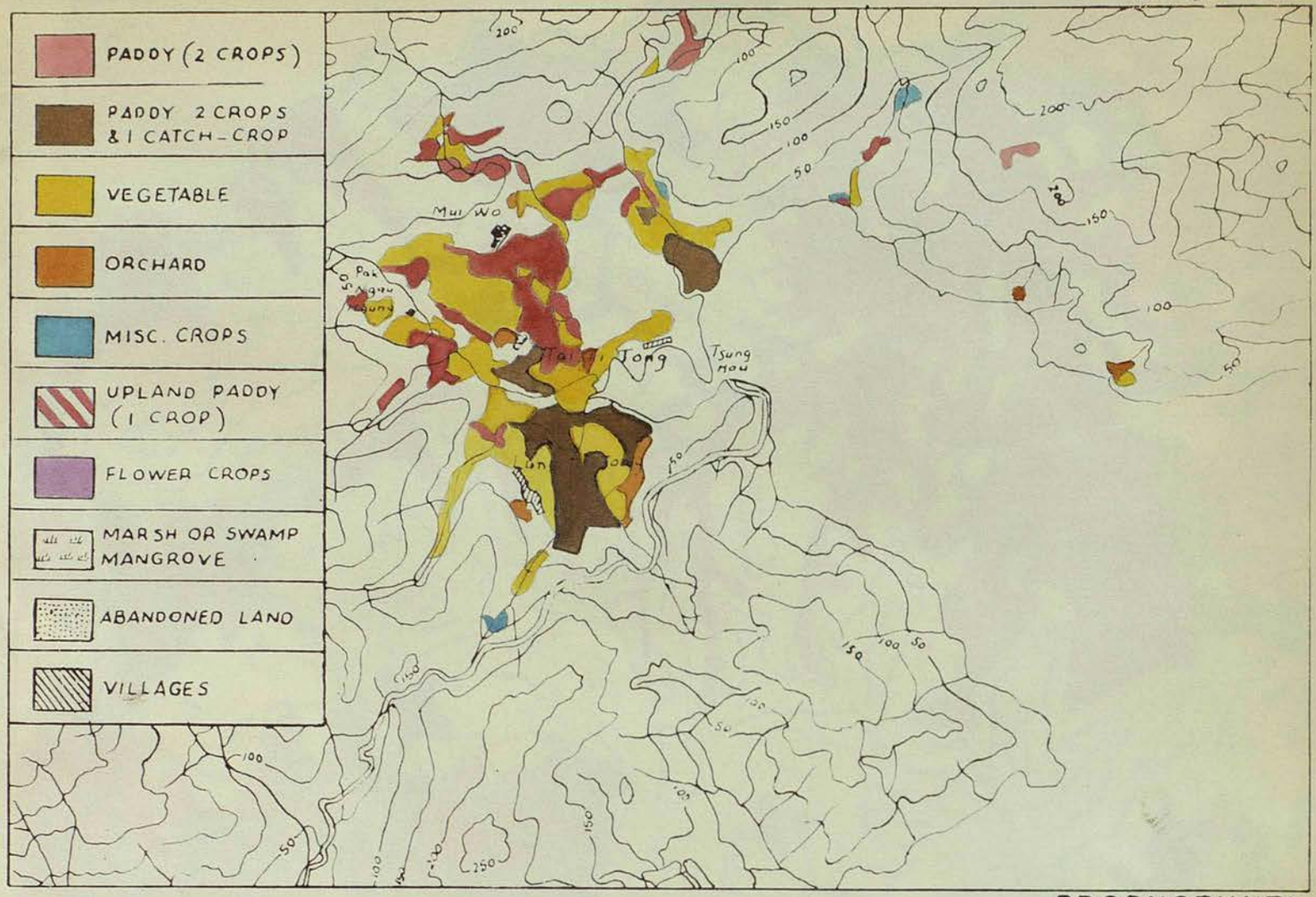


1000 500 0 1000 YARDS

MUI WO

Fig. 23(a).

LAND USE



PRODUCTIVITY (b)

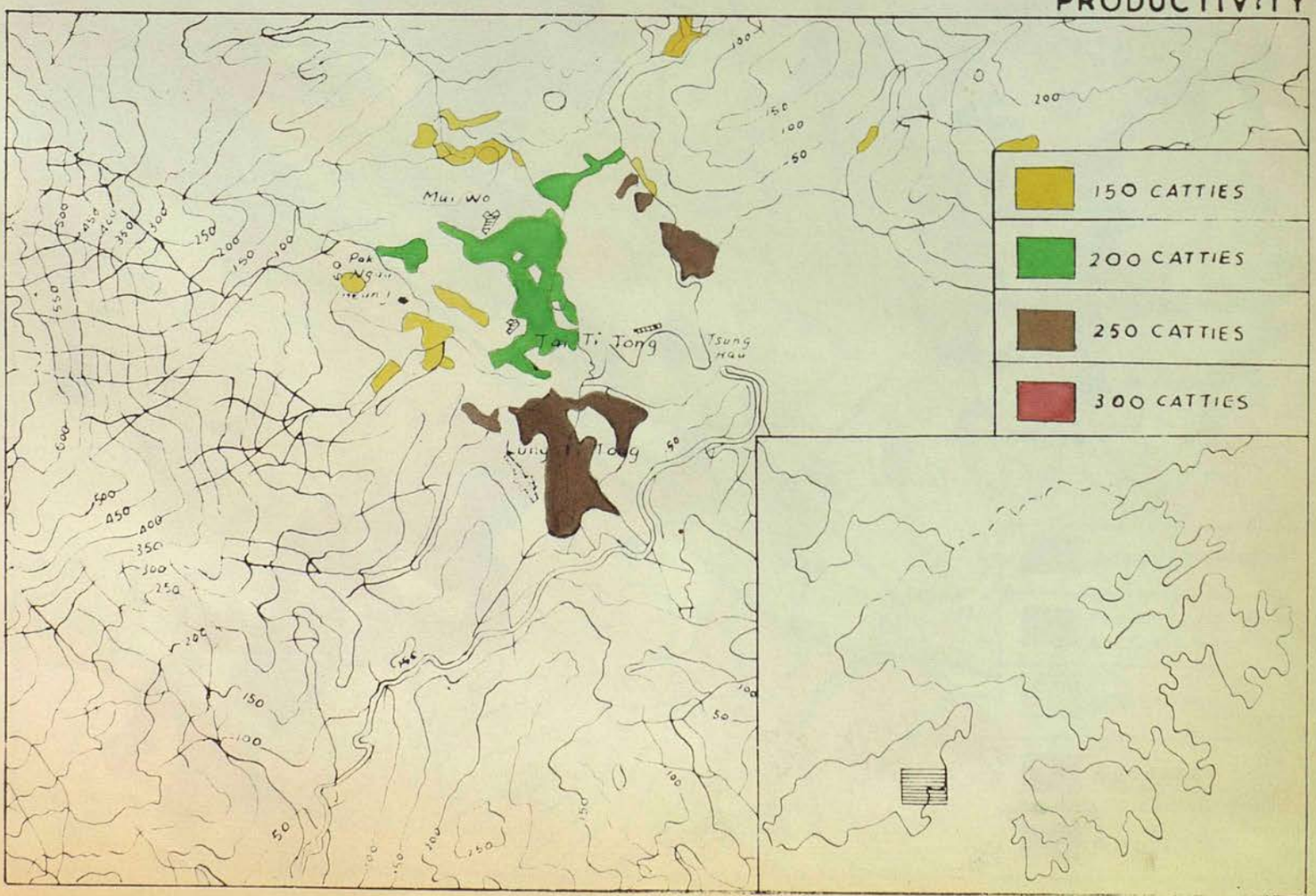


Fig. 24 (a).

FAN LING — TA KU LING

LAND USE

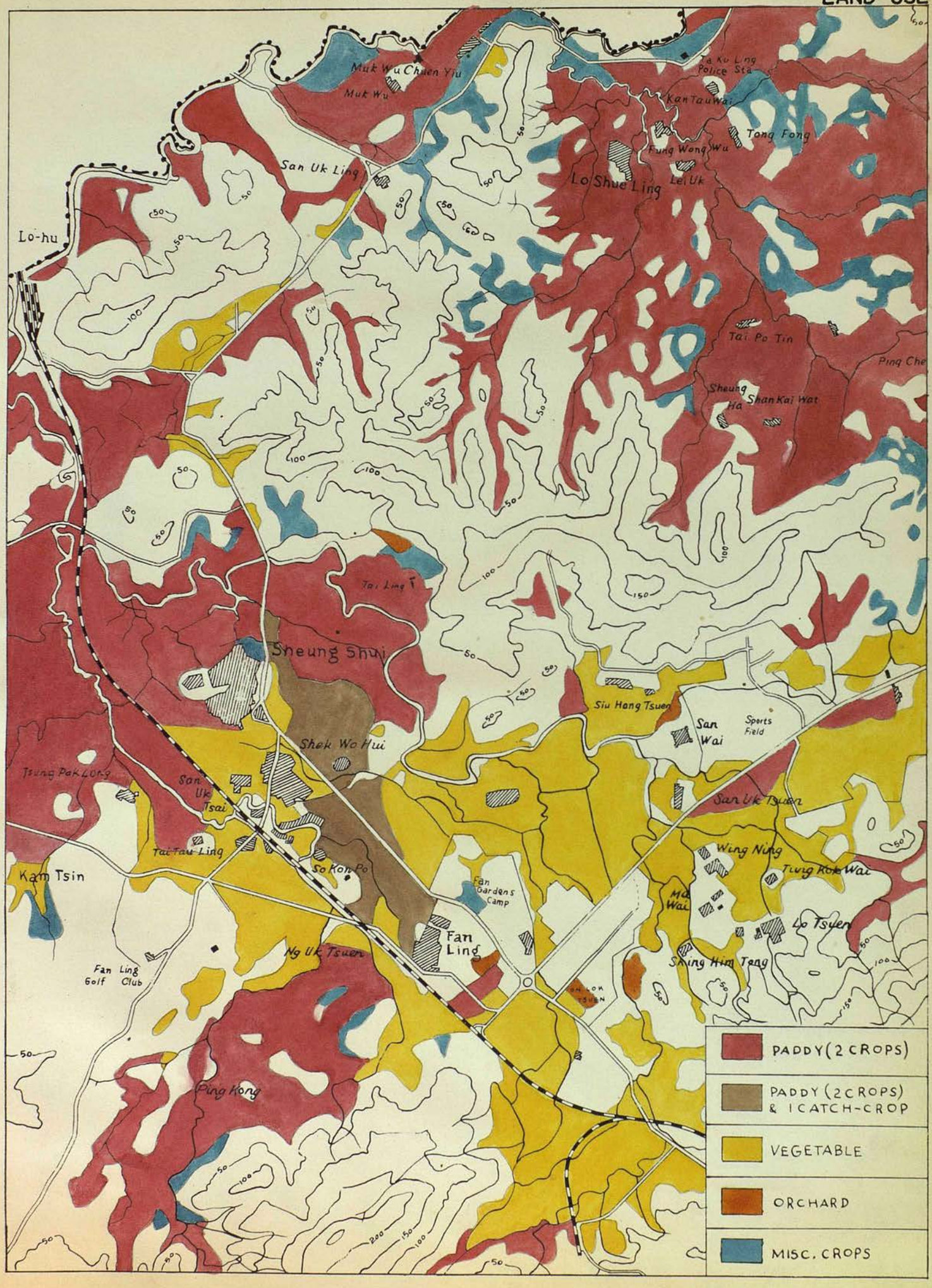
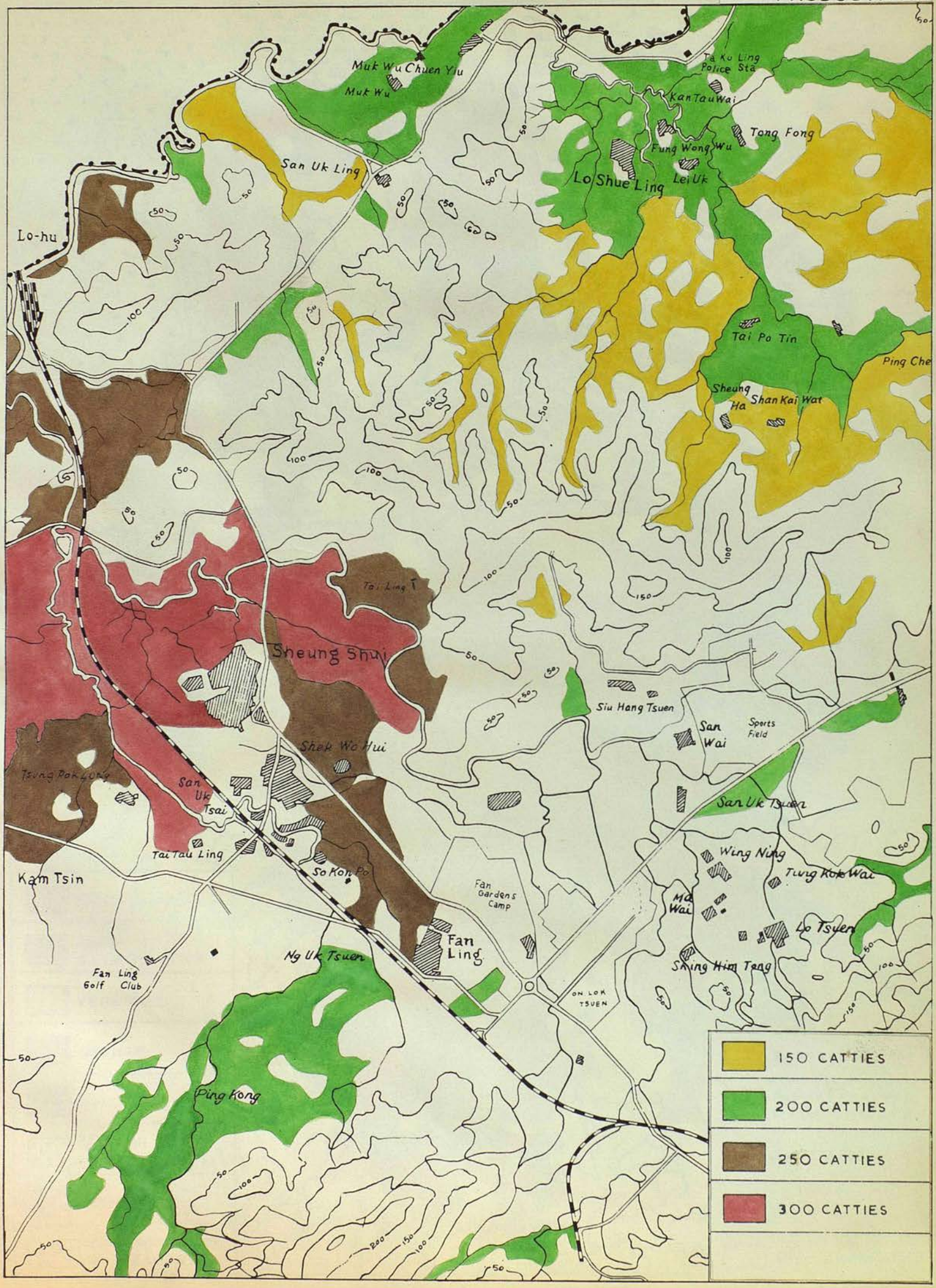


Fig. 24 (b).

FAN LING—TA KU LING

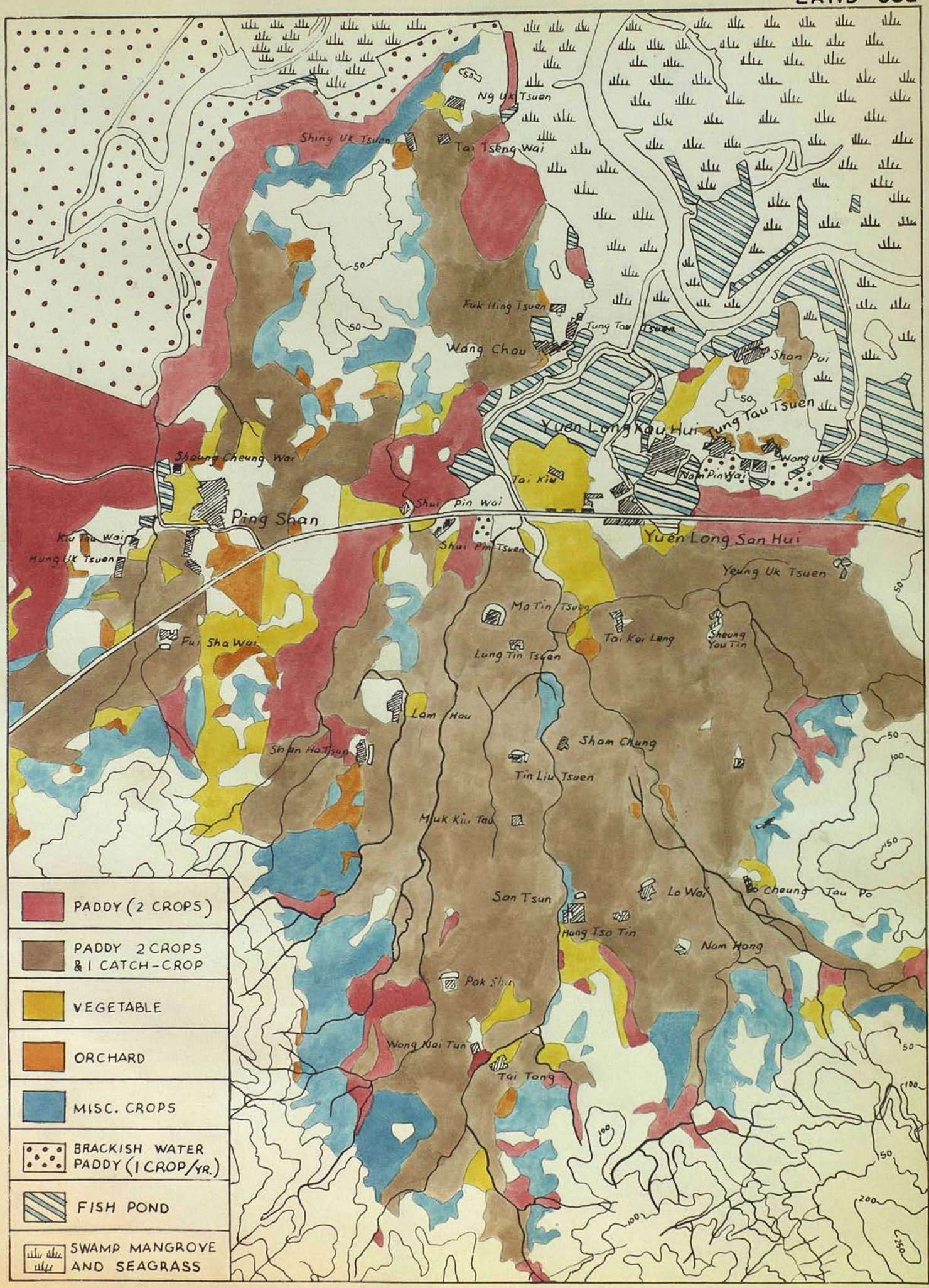
PRODUCTIVITY



YUEN LONG

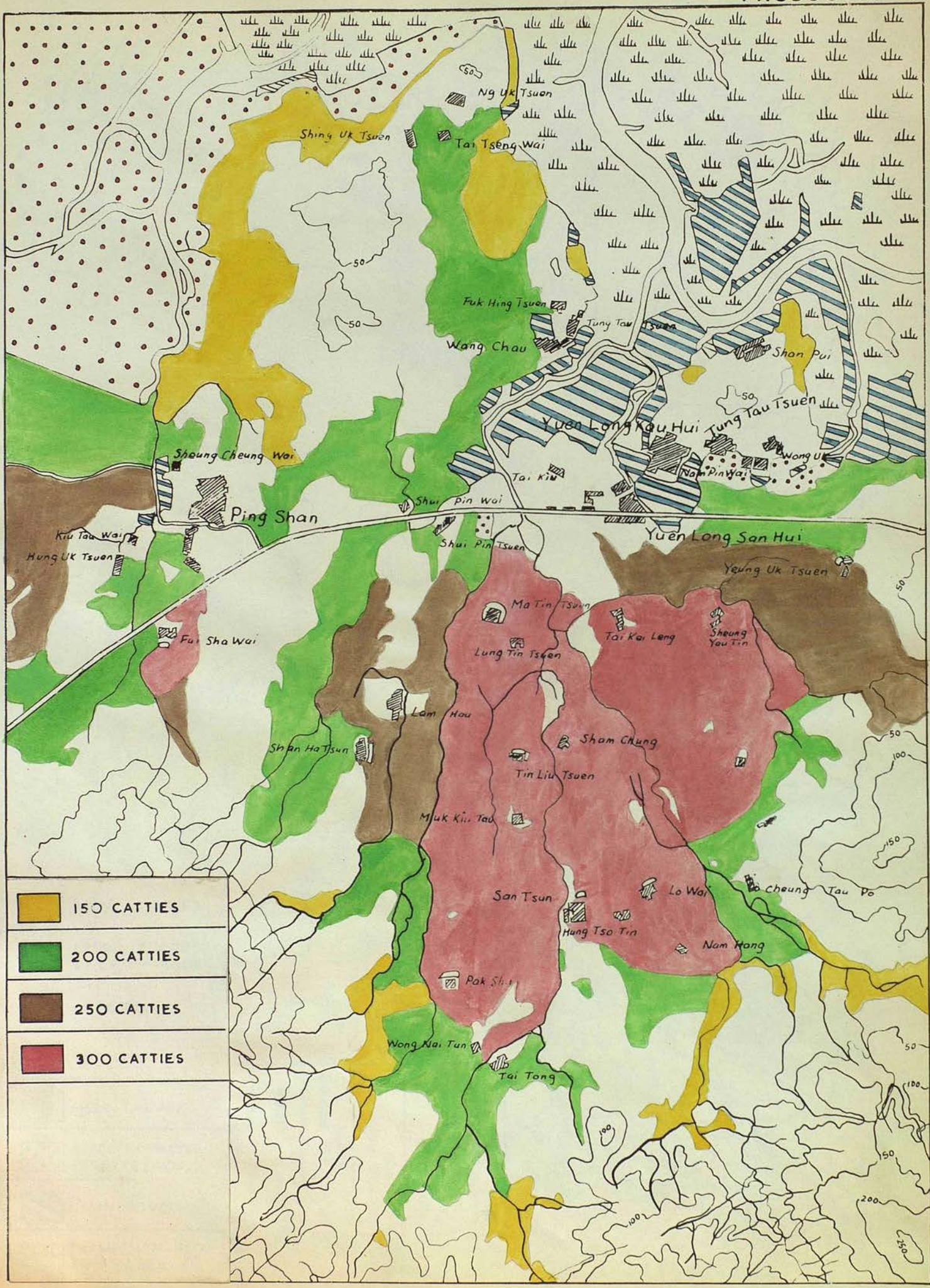
Fig. 25 (a).

LAND USE



YUEN LONG

Fig. 25 (b).
PRODUCTIVITY



SHA TIN

LAND USE

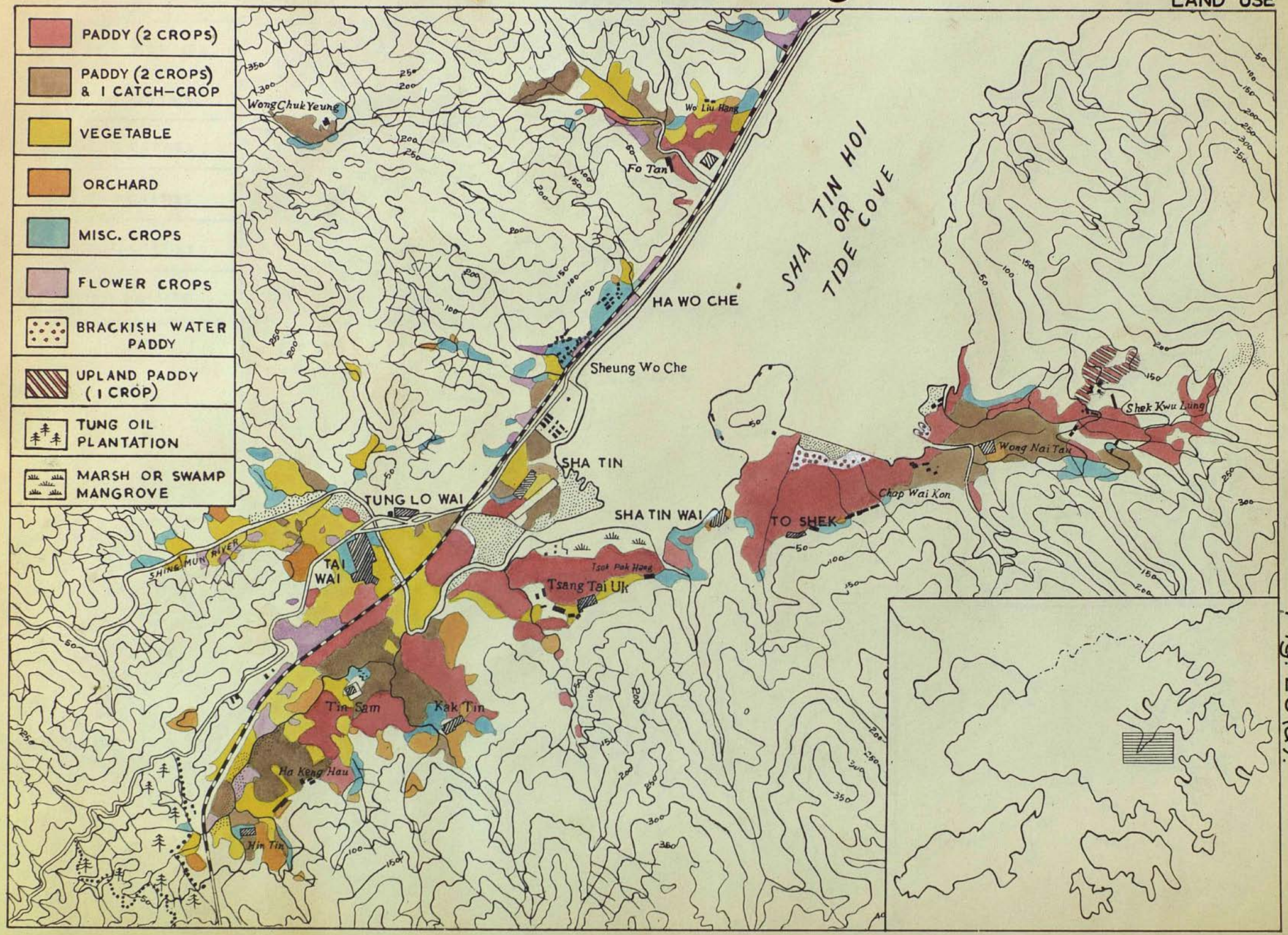


Fig. 26(a).

SHA TIN

PRODUCTIVITY

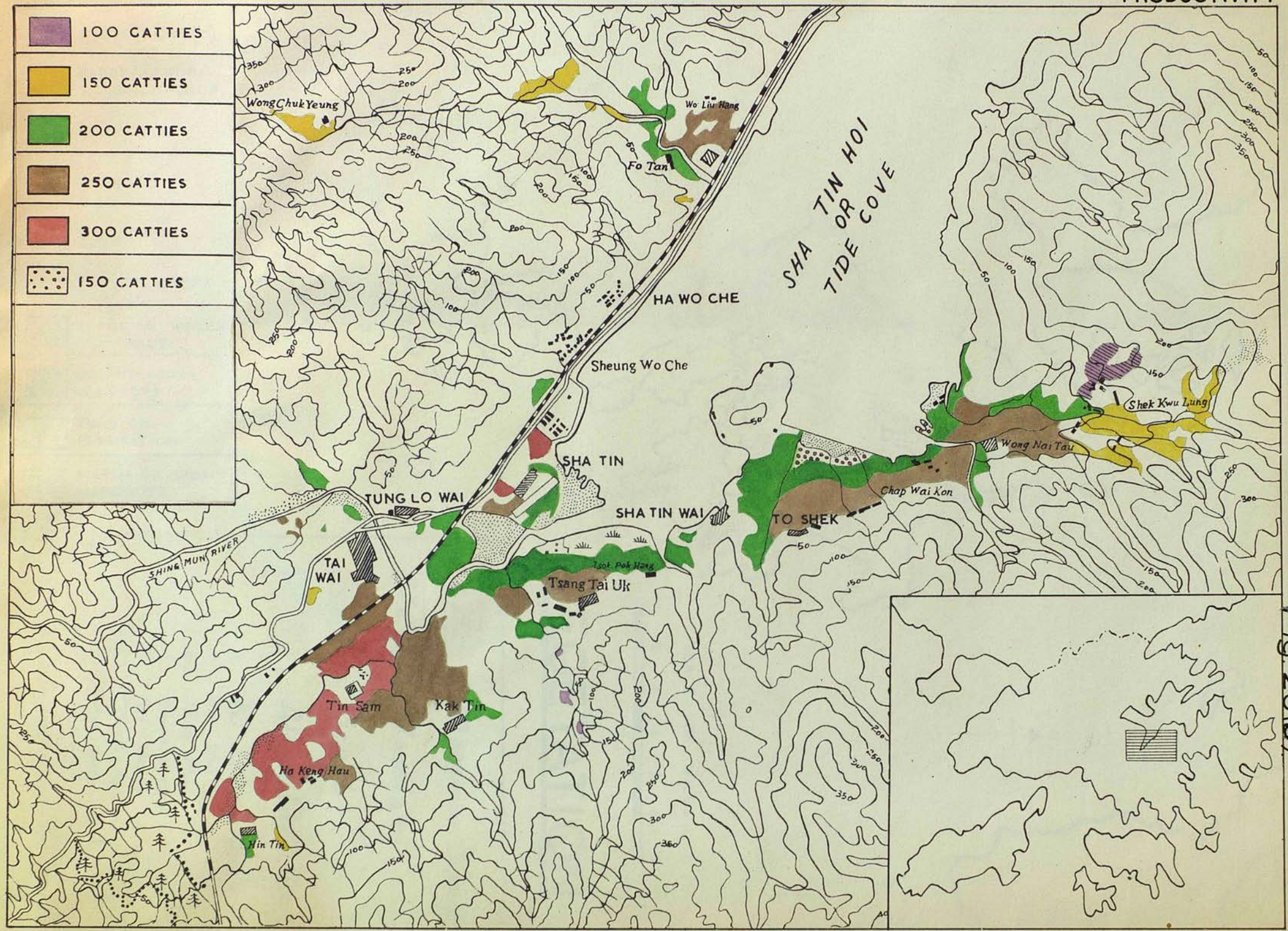


Fig. 26(b)

Fig. 27

N

SCALE OF MILES

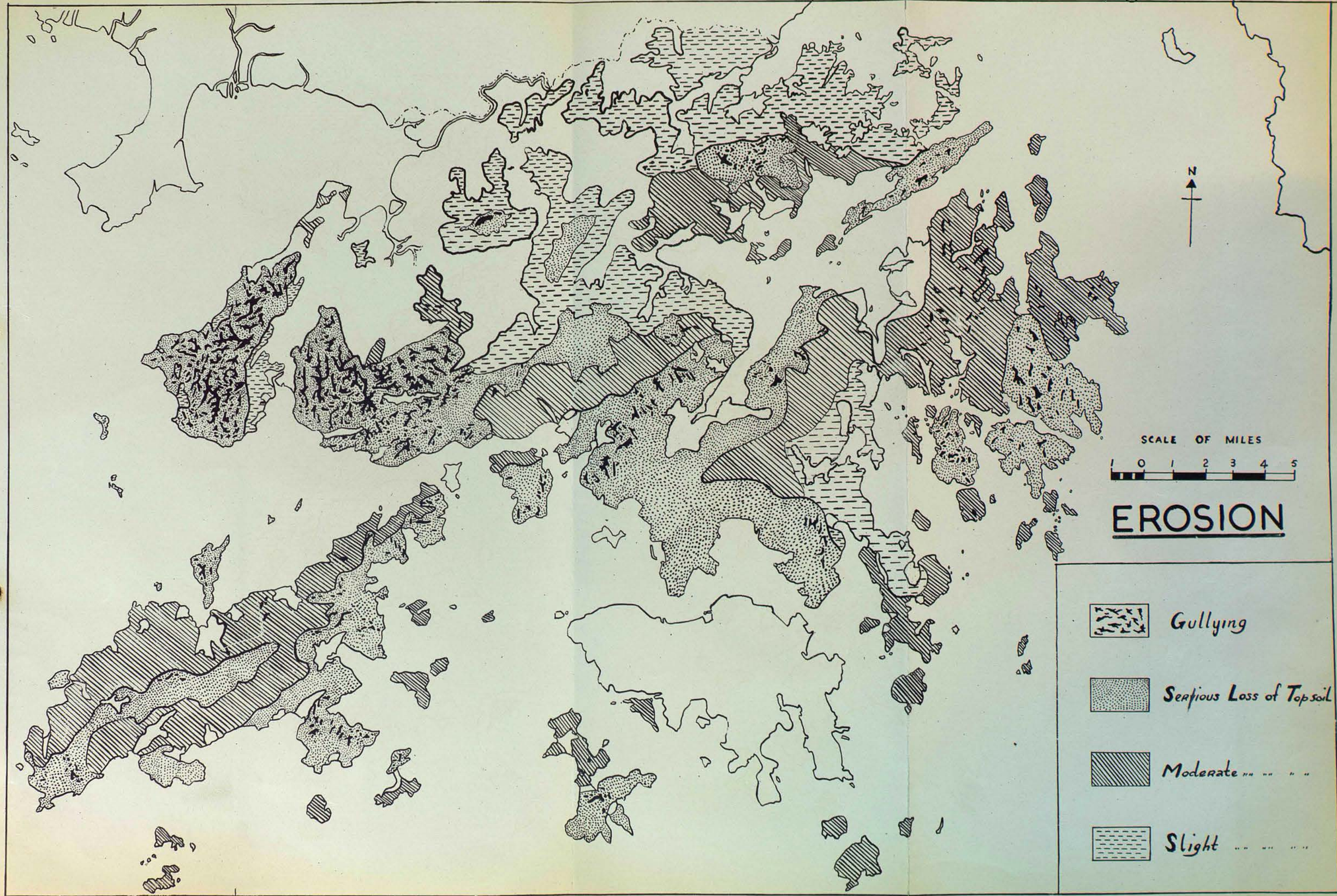
1 0 1 2 3 4 5

VEGETATION

- Mangrove Swamp
- Woodland
- Scrub
- Afforestation Areas

1. Tai Lam Forestry Reserve
2. Fu Shui " "
3. Shing Mun " "
4. Kowloon Hill " "
5. Pat Heung " "
6. Tai Po Kau " "
7. Shap Long " "

Fig. 28.

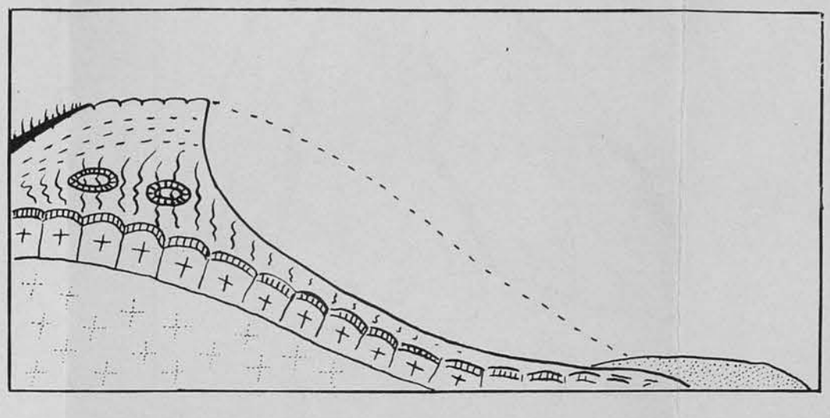

N
SCALE OF MILES
1 0 1 2 3 4 5
EROSION
Gullying
Serious Loss of Topsoil
Moderate
Slight

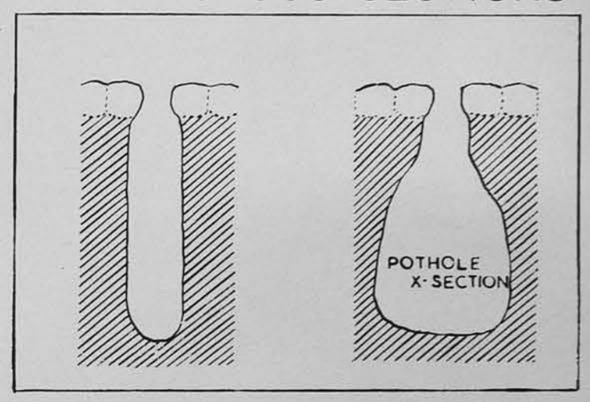
STAGES IN THE FORMATION OF GULLIES

LONGITUDINAL SECTIONS

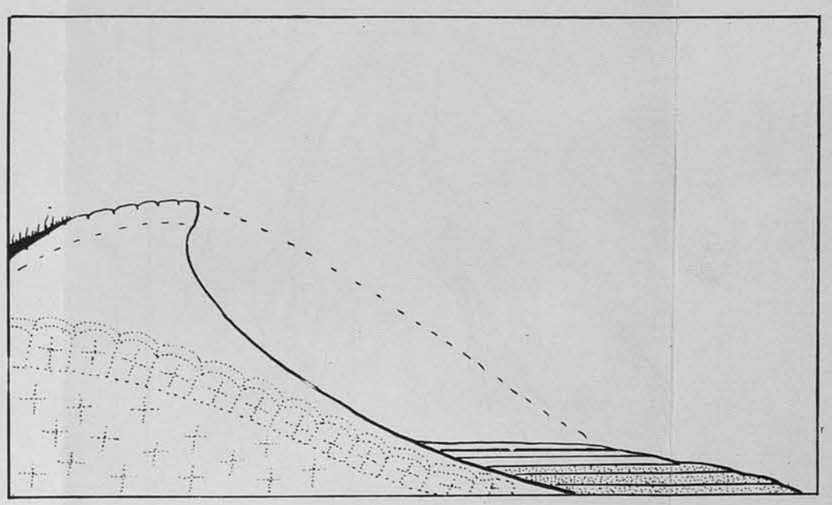
CROSS SECTIONS

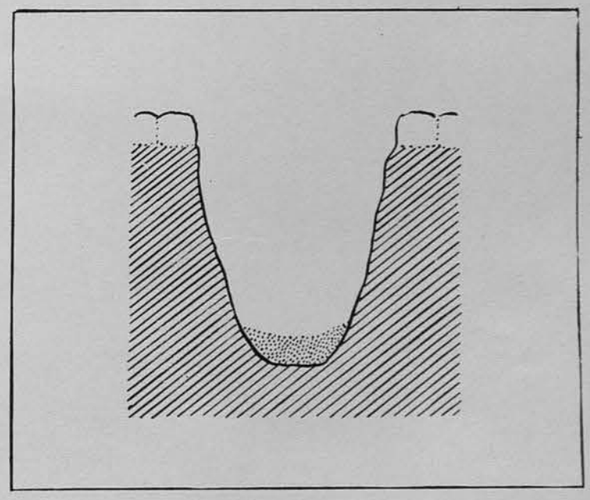
STAGE I



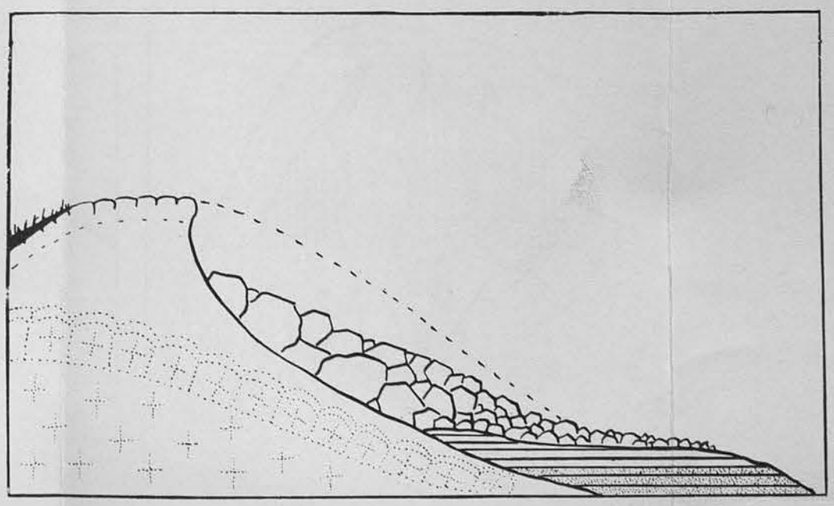


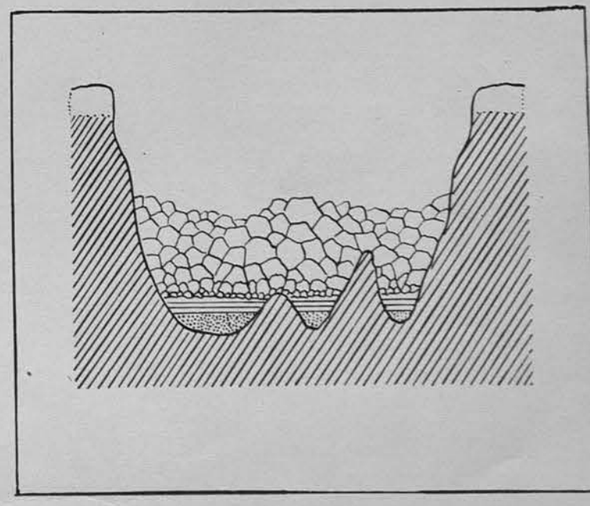
STAGE II





STAGE III





CROSS SECTION THROUGH ERODED GRANITE HILLS

(THE SOUTH AND WEST FACING SLOPES ARE BARE AND
ERODED BUT NORTH FACING SLOPES ARE GRASS COVERED)

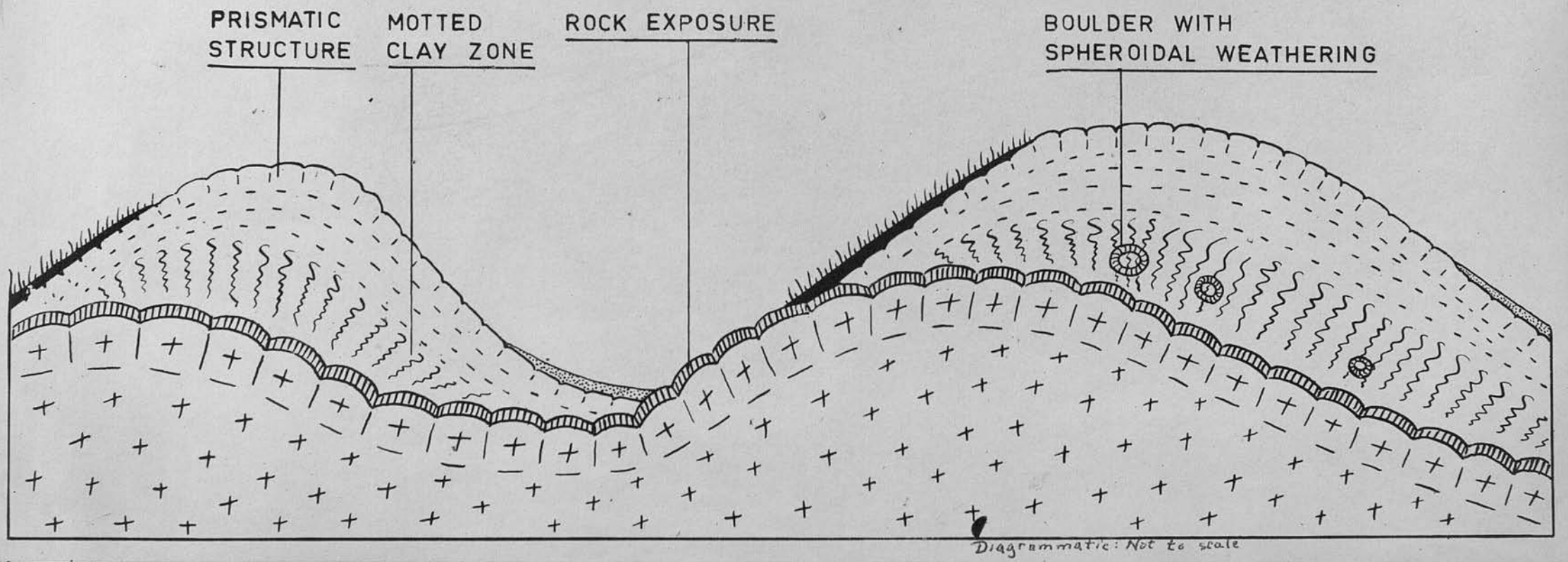
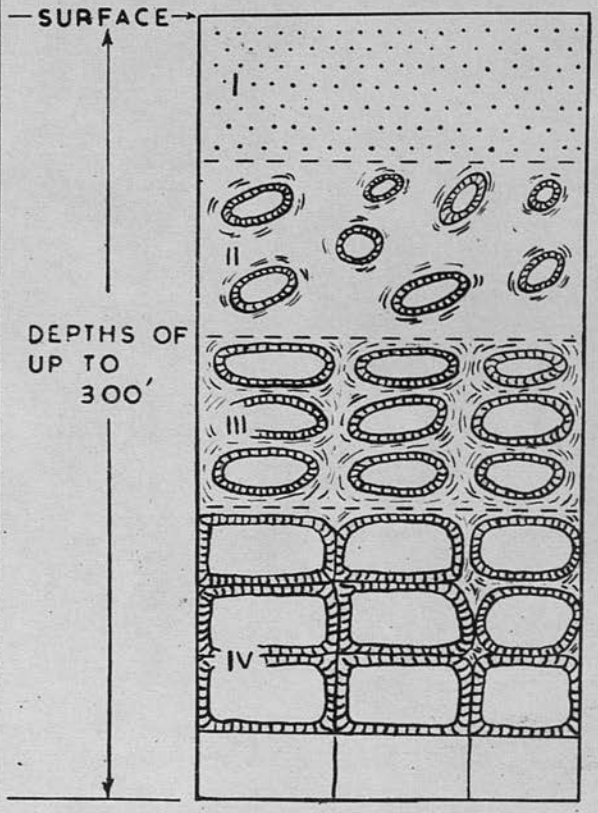


Fig. 30.

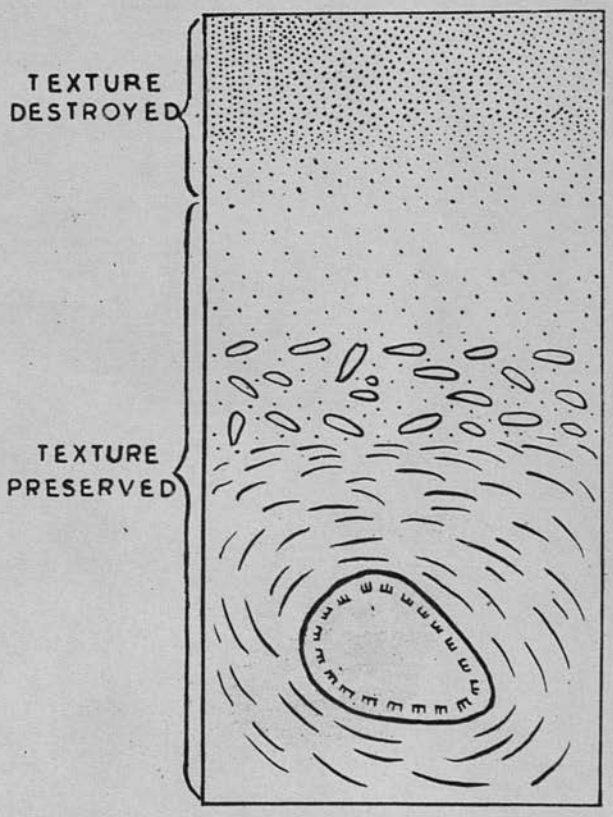
Fig. 31.

WEATHERING PROFILES



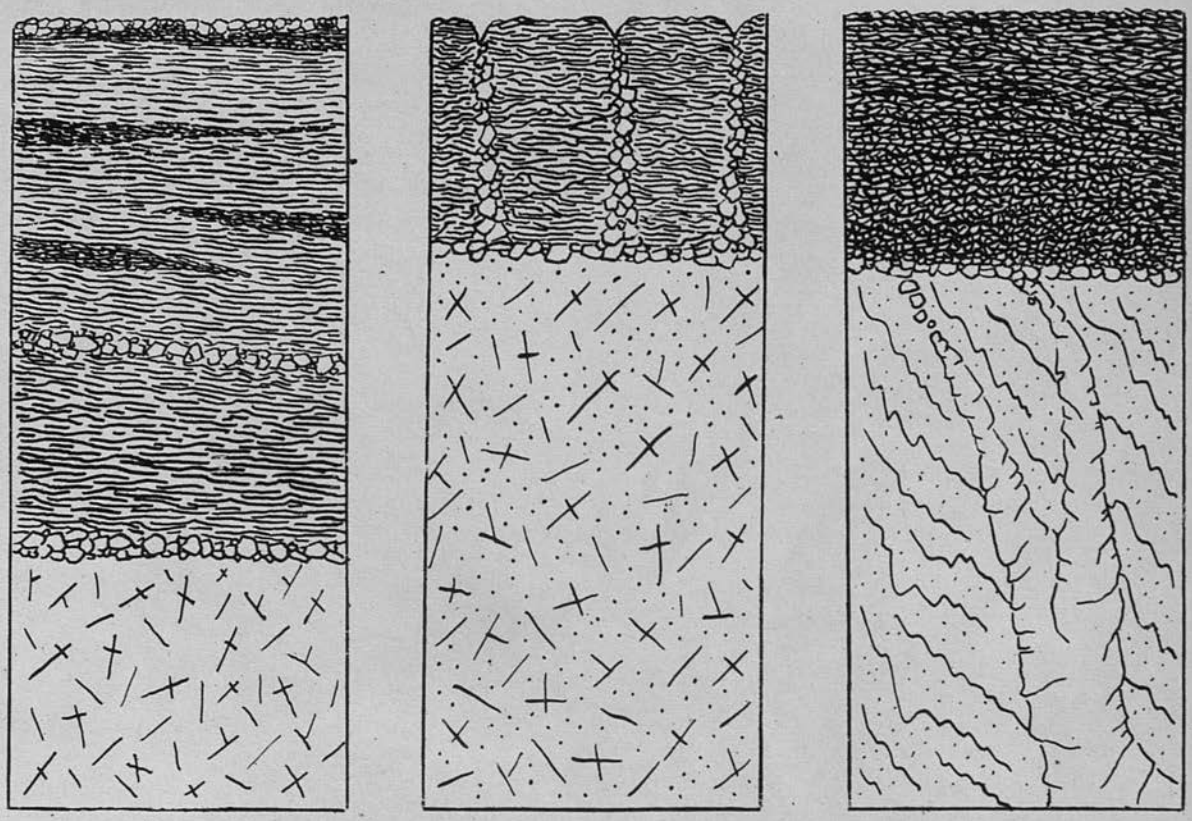
A. THE COMPLETE REGOLITH PROFILE ON GRANITE.

(After Berry & Ruxton)



B. WEATHERING ROUND A CORE STONE

Fig. 32.



"STONE LINE" CHARACTERISTICS IN TRANSPORTED & IN 'IN SITU' SOIL.

(a) Alluvial material in an eroded granite area where quartz grit accumulates on the surface by afflation in a dry period and is later covered by finer material in a wet period.

(b) Quartz grit accumulation in the cracks in surface of denuded and sun-baked weathered granitic material.

(c) Quartz accumulation at the base of the organic horizon of 'in situ' krasnosem.

Plate I.

Tai Hang, a Cantonese walled village

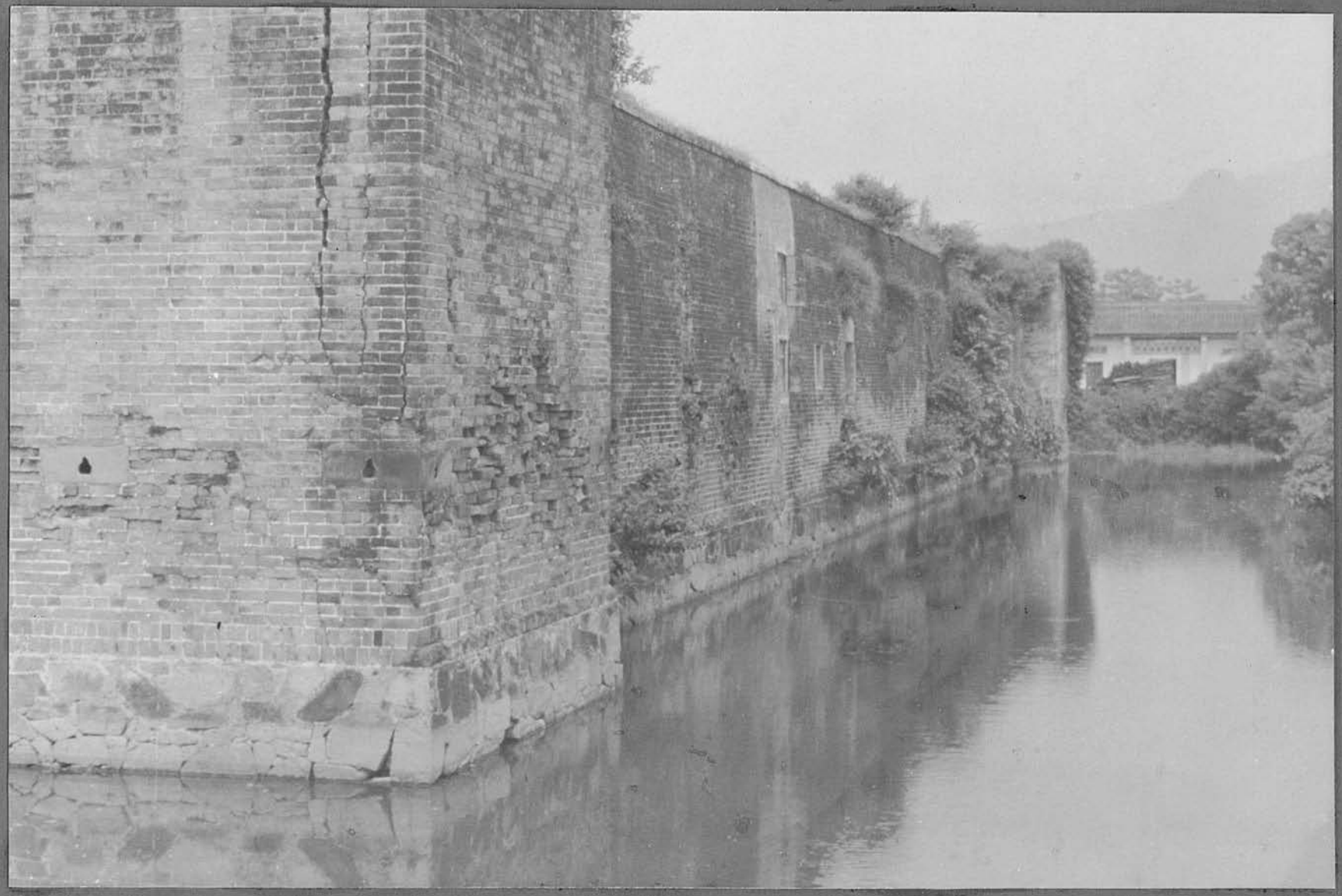


Plate 2.

The walls and moat surrounding Tai Hong Wai in Kam Tin.

Plate 3.

Chuk Hang, a typical Hakka village. In front of the village is the semicircular pool which serves as a sewage tank, fish pond, duck pond, and source of "Canton Mud" fertiliser. The village is typically situated on the poorer soils of the foothills surrounding the Kam Tin basin.

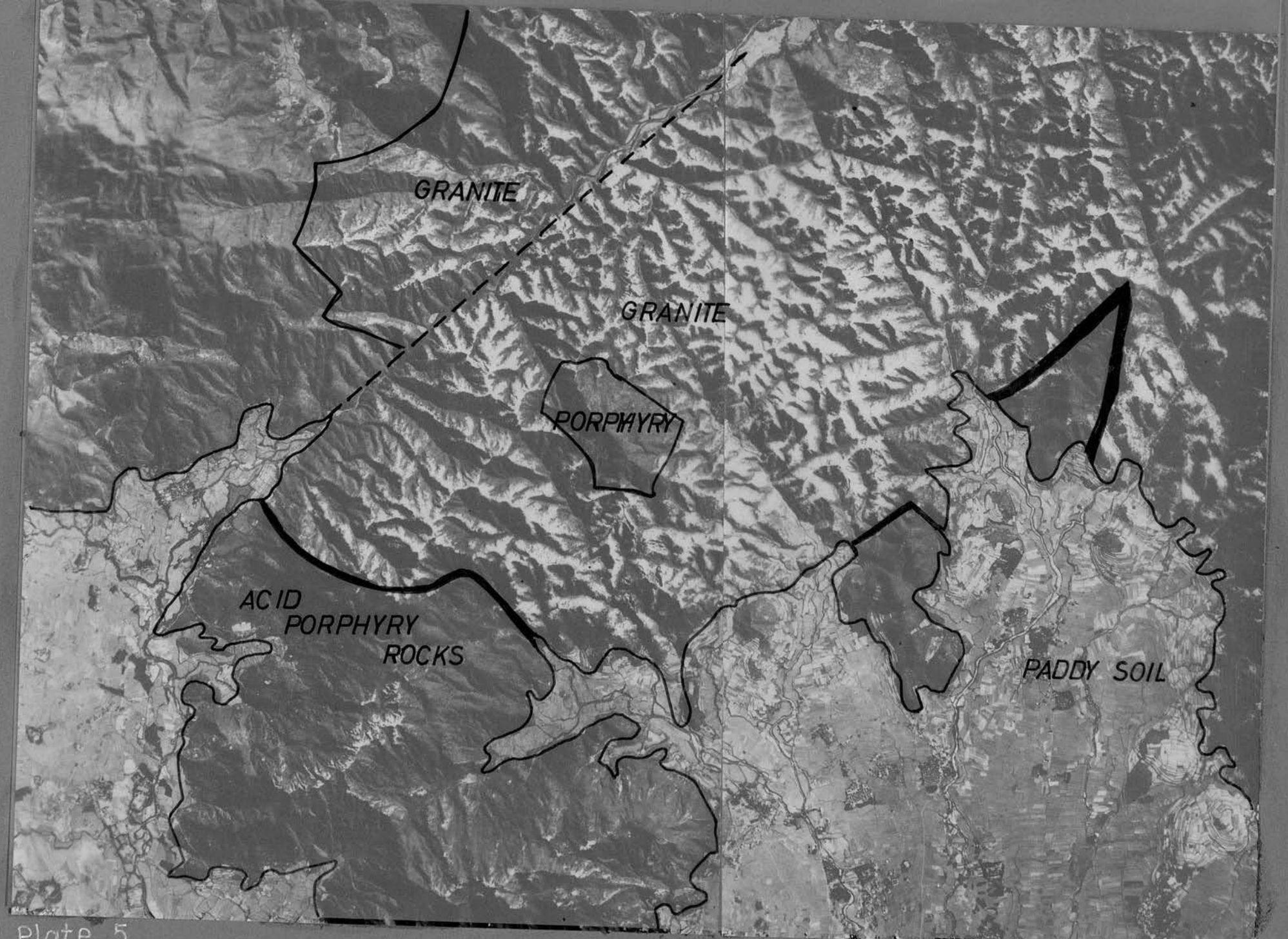


Plate 5.

A vertical air photo from a height of 29,200' of parts of the badly eroded granite area along the Tai Lam Chung valley. The sharp distinction between the granite and the acid porphyry rocks is striking. Note that the N and E facing hillsides are less seriously eroded than those which face S and W.

Plate 4.

An aerial view of Chuk Hang.

Plate 7.

View from Tai Po towards the gap cut by the Lam Tsuen stream in the side of the Lam Tsuen/Tai Hang Fault

Fault and shatter lines

Plate 6.

A vertical air photo from 29,200' of part of Sai Kung Peninsula.

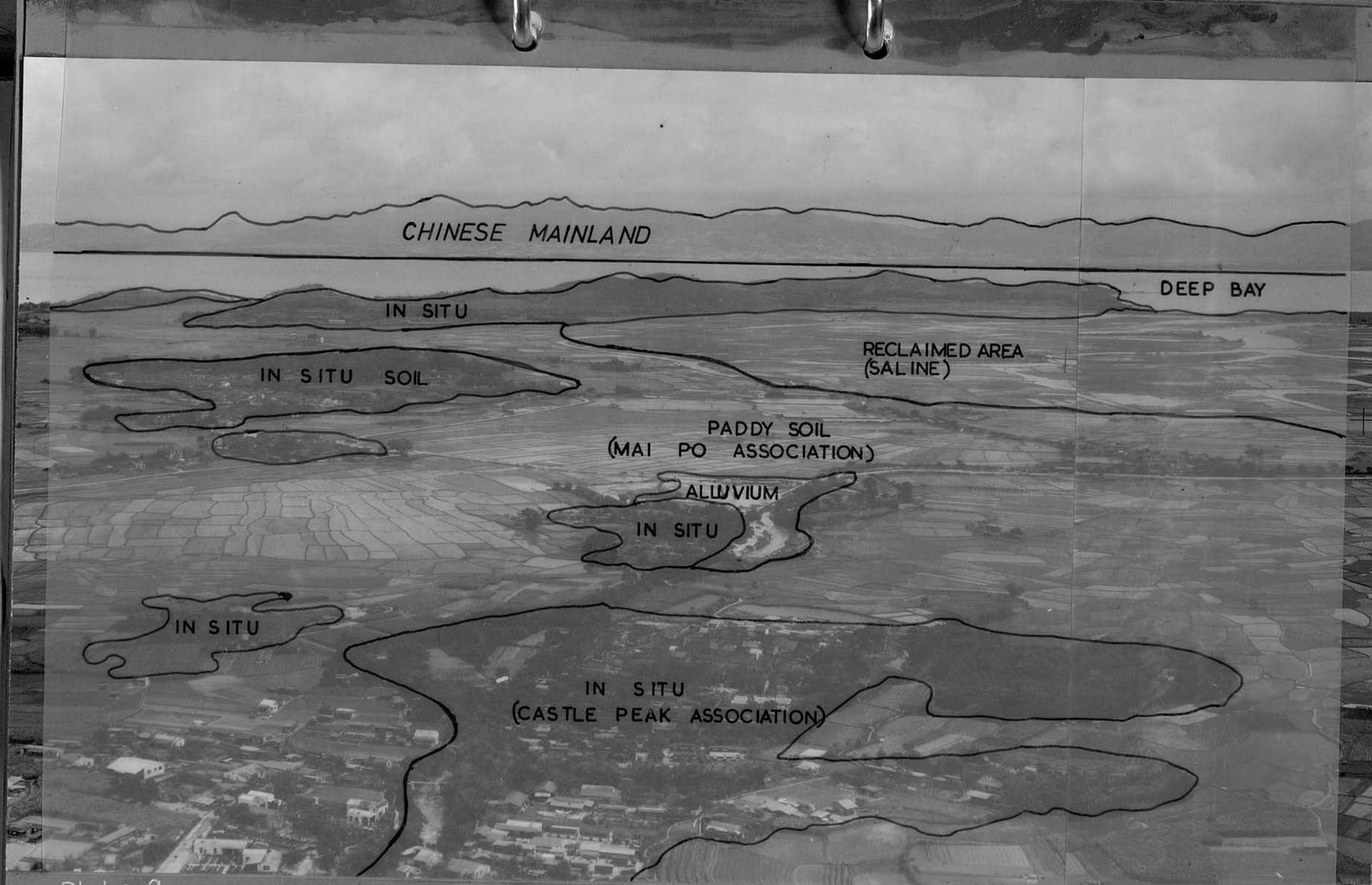


Plate 9.

An oblique aerial view of the Ha Tsuen reclaimed area of Deep Bay Marshes.

Plate 10.

Shatin Valley. In the foreground are mudflats of recent submergence.

Plate 8.

An oblique aerial view SW along the Lam Tsuen Valley. The belt of trees across the foreground marks the line of low hills of bouldery material which blocked the Lam Tsuen Stream causing it to cut a new course out of the valley.

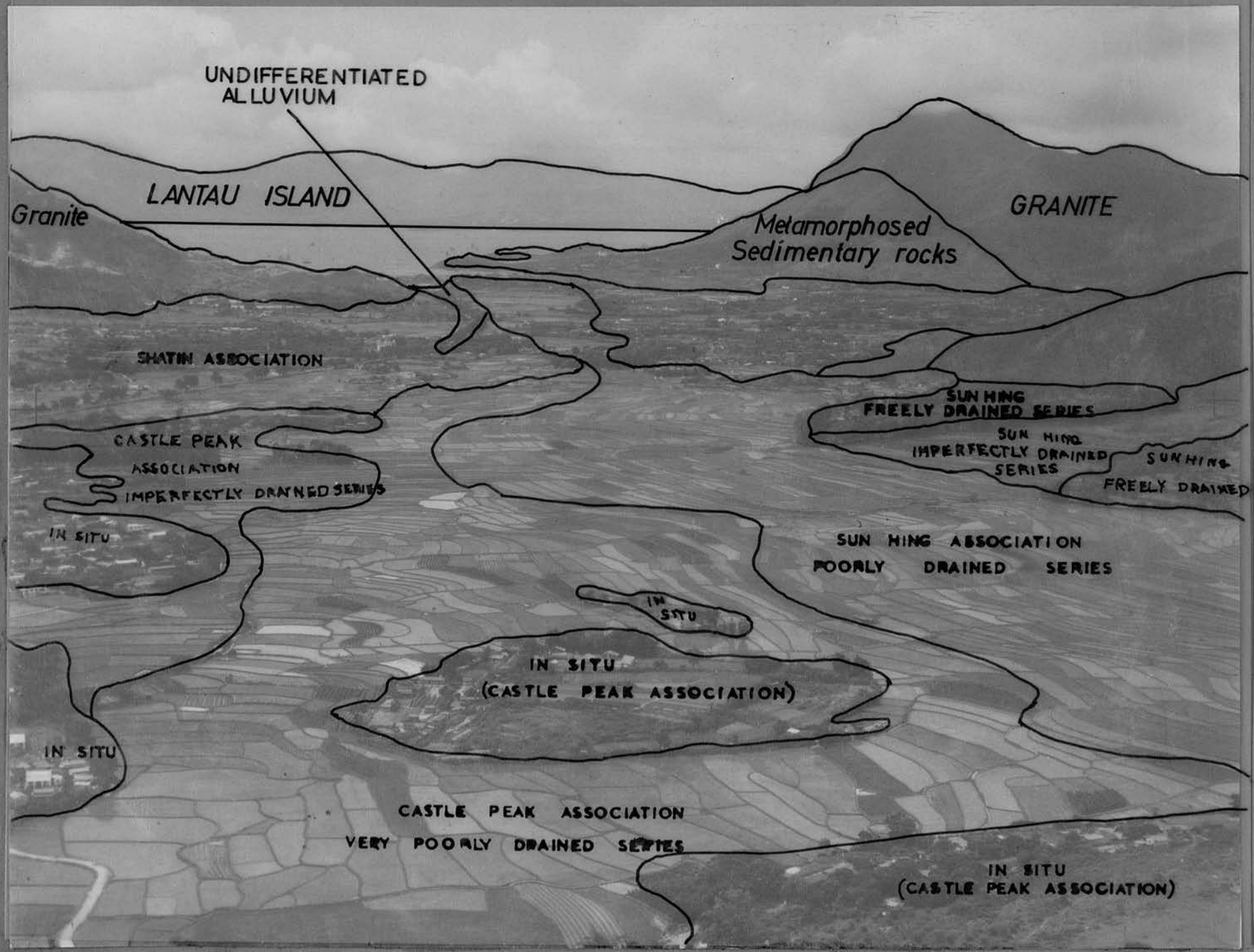
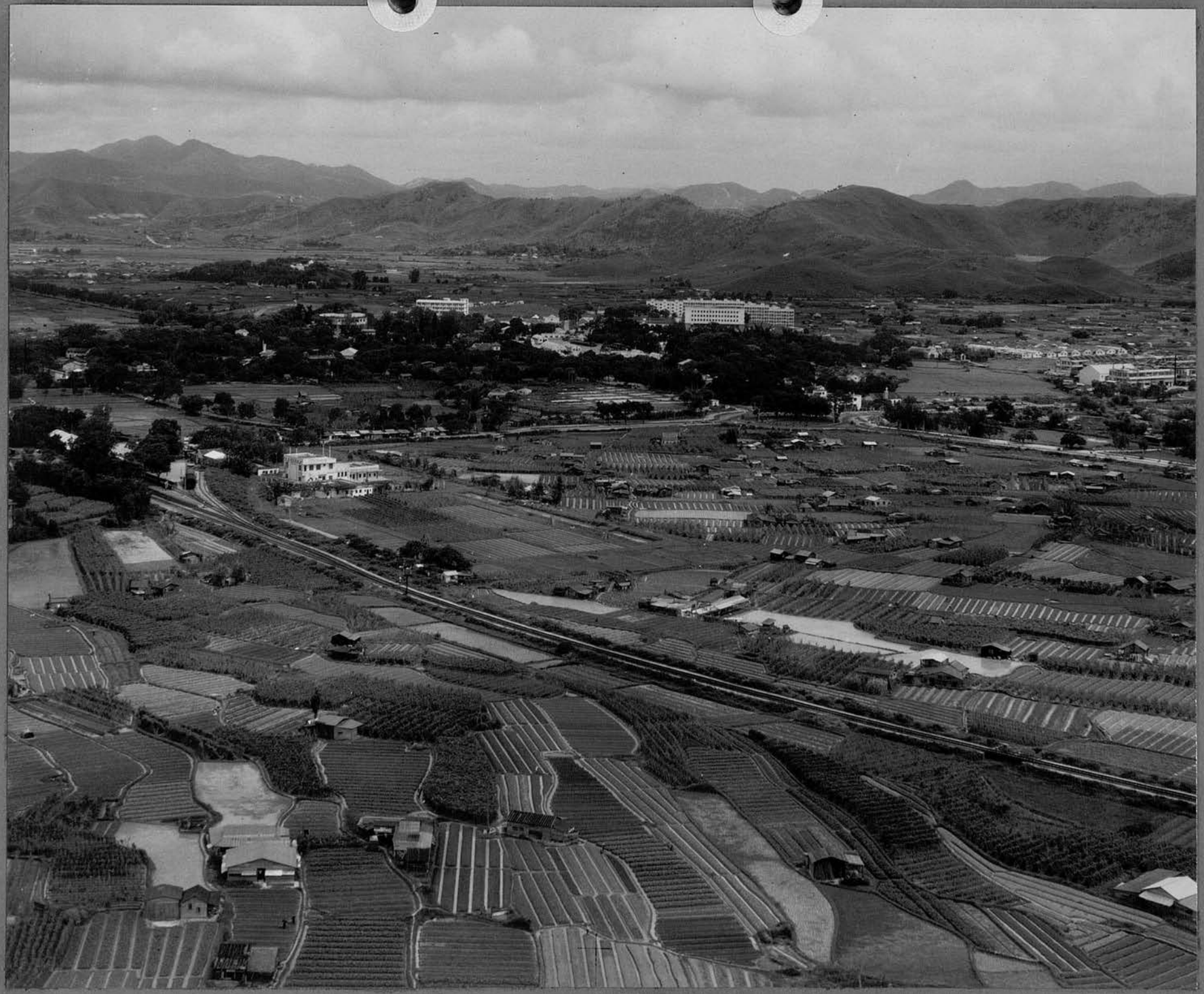


Plate 11.

The Castle Peak valley.



13.

Plate 13.

The Fanling vegetable growing district. Fragmentation is extreme, housing and sanitation is of a very low standard.

Plate 12.

Deep Bay marshes and the fishponds surrounding Yuen Long.

Plate 14.

Mui Wo. The porphyritic granite which forms the hills behind Mui Wo is much less subject to gully erosion than the granite elsewhere in the New Territories.

Plate 15. Tung Chung valley.

Plate 16.

Serious gully erosion in the Tai Lam Chung area.

Plate 17.

Mesa-like remnants of surface soil in an area predominantly eroded down to the tough B_3 and B/C horizons. The soil was a Red-Yellow Podsolic and the hardpan surmounted by a leached horizon may be seen under the grass.

Plate 18.

Closer view of one of the surface soil remnants seen in Plate 17. The hardpan is strikingly undercut. On the subsoil pavement in the foreground there is an accumulation of quartz grit.

Plate 19.

A large gully in decomposed granite at Castle Peak.

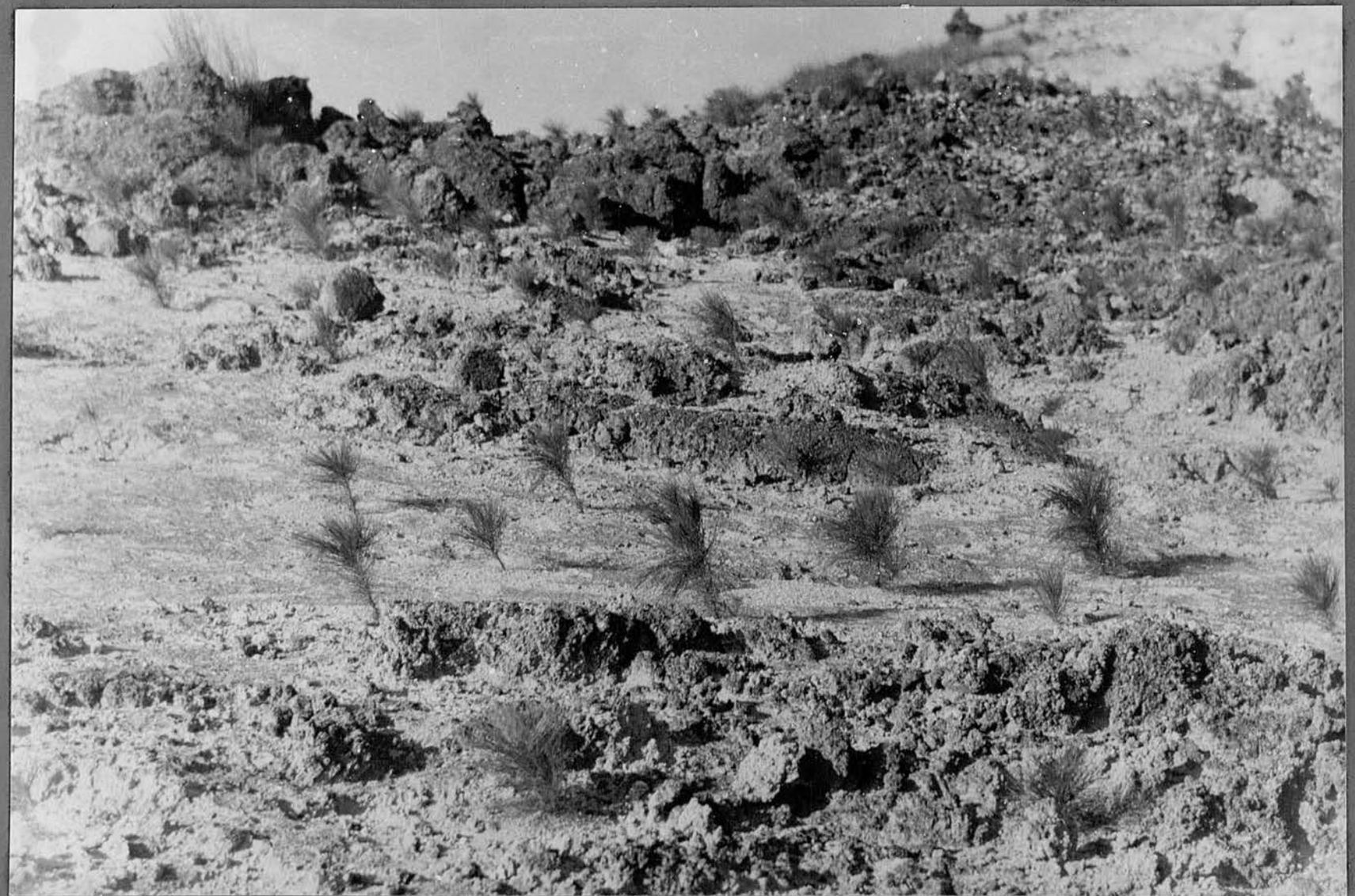


Plate 20.

One of the few small patches lateritic material in Hong Kong. Afforestation is being attempted with pinus massoniana.

Plate 21.

A road cutting showing a Red-Yellow Podsolic soil developed on decomposed granite.

CASTLE PEAK, YUEN LONG and SEK KONG

PARENT MATERIALS		ASSOCIATIONS	SERIES				
PARENT ROCKS	MATERIALS		FREELY DRAINED	IMPERFECTLY DRAINED	POORLY DRAINED	VERY POORLY DRAINED	SALINE
TAI MO SHAN PORPHRIES AND VOLCANICS	IN SITU	CASTLE PEAK		CP PPH	CP PH	CP HP	
	IN SITU & BOULDER FAN	CASTLE PEAK B		CP B PPH	CP B PH		
	BOULDER FAN	SEK KONG	SK P	SK PPH	SK PH		
	BOULDER FAN (ENRICHE BY MORE RECENT ALLUVIUM)	LAM TSUEN	LT P	LT PPH	LT PH		
	COLLUVIUM & ALLUVIAL FAN	SUN HING	SH P	SH PPH	SH PH	SH HP	
	ALLUVIAL	CHIK NAI PING	CNP P	CNP PPH	CNP PH	CNP HP	
LOK MA CHAU METAMORPHOSED PAT SIN	ALLUVIAL & COLLUVIAL	MAI PO	MP P	MP PPH	MP PH	MP HP	MP S
GRANITE	ALLUVIAL & COLLUVIAL	SHA TIN	ST P	ST PPH	ST PH	ST HP	ST S
	MANGROVE SWAMP ALLUVIAL	FAN LING		FL PPH	FL PH		
	UNDIFFERENTIATED ALLUVIUM						
	MARINE SANDS		SD				

Surveyed by: C.J. Grant.
Agriculture, Fisheries & Forestry Dept.
Hong Kong. 1959.

SHEET No. 1

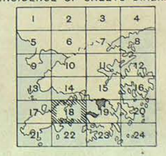
Contour Interval 10 Metres HEIGHTS IN METRES

Scale 1: 25,000

Yards 1000 500 0 1000 2000 3000 Yards

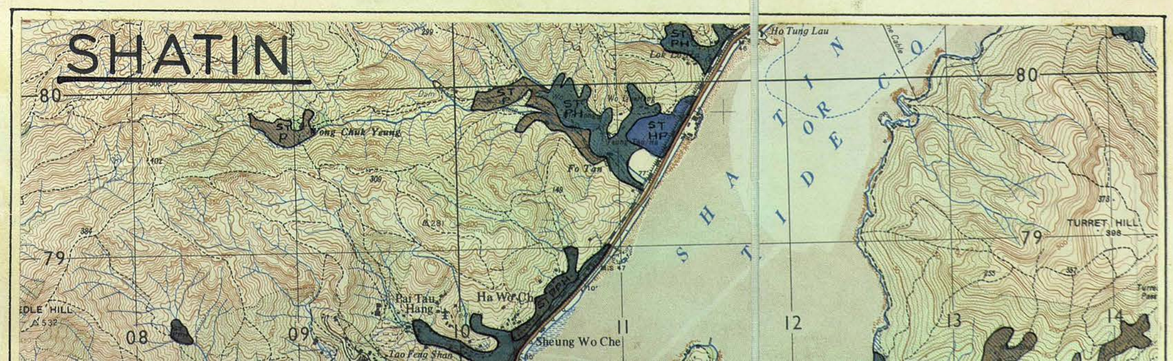
Metres 1000 500 0 1000 2000 3000 Metres

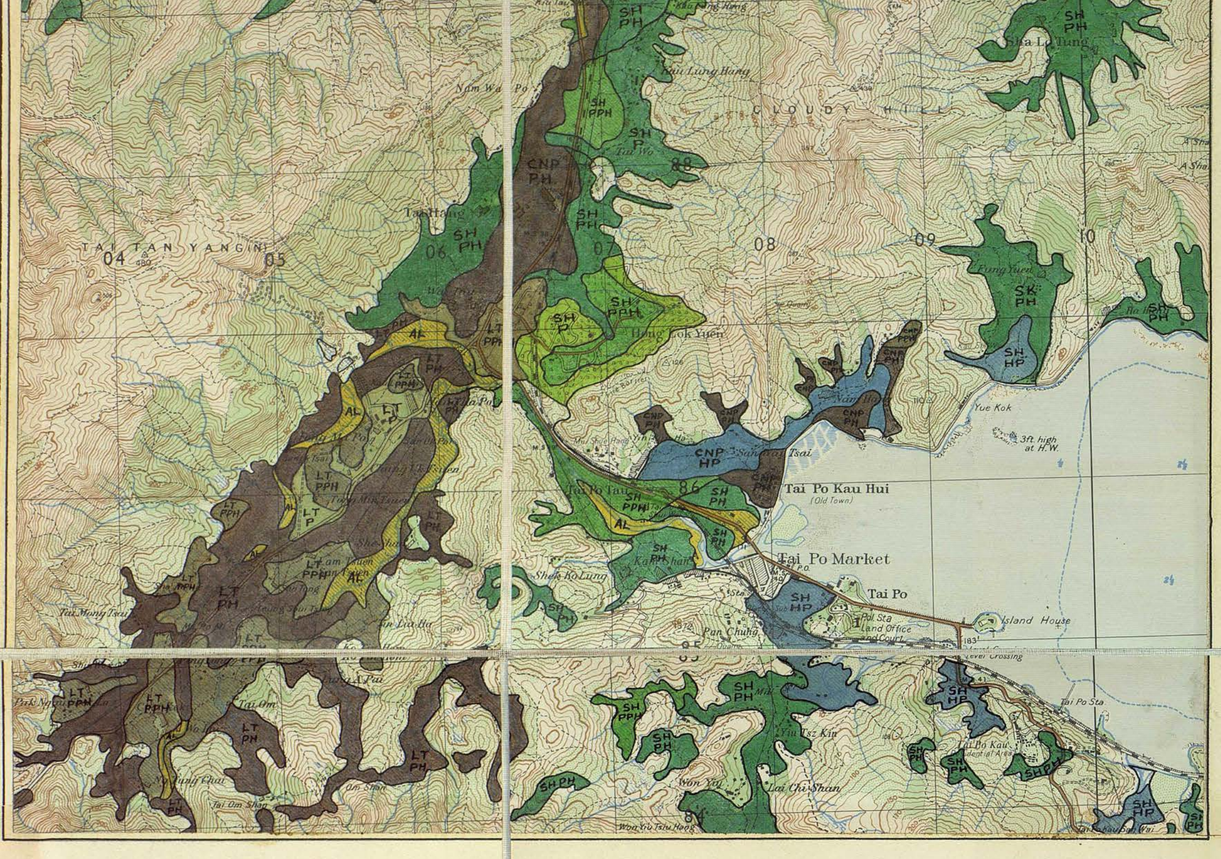
INCIDENCE OF SHEETS DIAGRAM



LAM TSUEN and FANLING

PARENT MATERIALS		ASSOCIATIONS	SERIES				
PARENT ROCKS	MATERIALS		FREELY DRAINED	IMPERFECTLY DRAINED	POORLY DRAINED	VERY POORLY DRAINED	SALINE
TAI MO SHAN PORPHRIES AND VOLCANICS	IN SITU	CASTLE PEAK		CP PPH	CP PH	CP HP	
	IN SITU & BOULDER FAN	CASTLE PEAK B		CP B PPH	CP B PH		
	BOULDER FAN	SEK KONG	SK P	SK PPH	SK PH		
	BOULDER FAN ENRICHE BY MORE RECENT ALLUVIUM	LAM TSUEN	LT P	LT PPH	LT PH		
	COLLUVIUM & ALLUVIAL FAN	SUN HING	SH P	SH PPH	SH PH	SH HP	
	ALLUVIAL	CHIK NAI PING	CNP P	CNP PPH	CNP PH	CNP HP	
LOK MA CHAU METAMORPHOSED PAT SIN	ALLUVIAL & COLLUVIAL	MAI PO	MP P	MP PPH	MP PH	MP HP	MP S
GRANITE	ALLUVIAL & COLLUVIAL	SHA TIN	ST P	ST PPH	ST PH	ST HP	ST S
	MANGROVE SWAMP ALLUVIAL	FAN LING		FL PPH	FL PH		
	UNDIFFERENTIATED ALLUVIUM						
	MARINE SANDS		SD				




TAI TAN YANGTZE
CLOUDY HILL
Tai Po Kau Hui
(Old Town)
Tai Po Market
Tai Po
Island House
Tai Po Sta
Tai Po Kau
Tai Chi Shan
Hung Fok Yuen
Yue Kok
Shek Ko Lung
Pan Chuha
Tai Mong Tsai
Tai Ling
Tai Wo
Tai Wo Ping
Kau Lung Hang
Nam Wa Po
Sha Lo Tung
Tai Po Sta
Level Crossing
Tai Po Kau
Tai Om
Tai Om Shan
Tai Yue Kin
Won Yiu
Won Yiu Tau Hoon
Tai Po Kau Hui
Tai Po Kau Tsai
Tai Po Kau Nam
Tai Po Kau Pei